# ENGINEERING AND MINING JOURNAL

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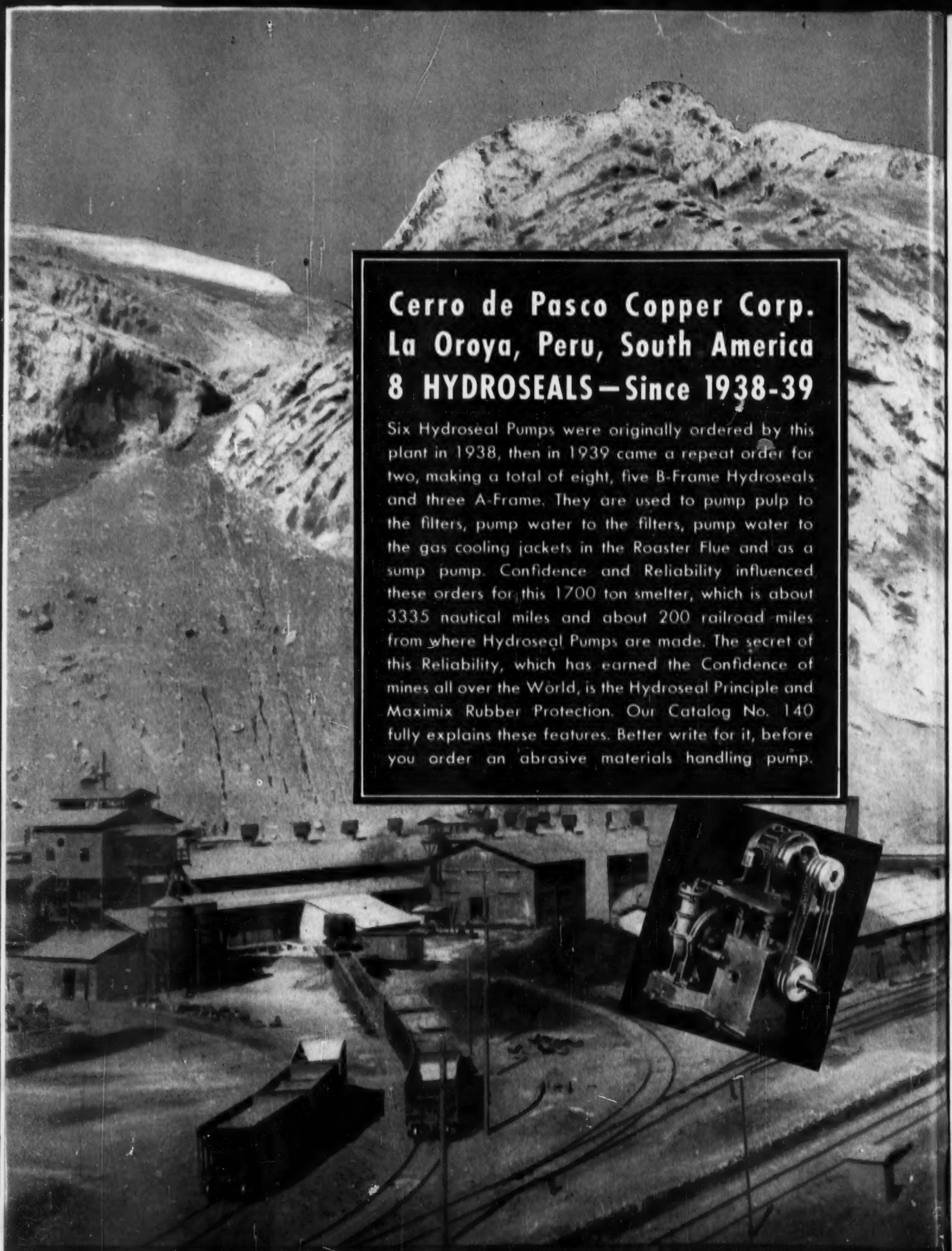
Blast-hole diamond drilling at a mine in northern New York

## Nationalism Hinders Investments Abroad

PAGE 52



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Volume 147 — **JANUARY, 1946** — Number 1



**Editorial** ..... 51

**Encouragement of Latin American Investment** ..... Howland Bancroft 52

**Diamond Drilling as Applied to Ore Production** ..... 58

**Problems Posed by Surplus Mines, Mills, and Smelters** ..... R. H. Ramsey 65

**Multiclone Units Recover Converter Dust Successfully** ..... Leonard Larson 71

**Bearing Wear Is Eliminated by Shunting Shaft Currents** ..... D. B. Hoover 75

**Moroccan Mine Develops Unusual Classifier** ..... E. J. Breton 77

**How Hudson Bay Runs Its Mine Warehouse—III** ..... P. G. Bishop 79

**Operating Ideas** ..... 82

**Market Summary** ..... 86

**Washington Reflections** ..... 88

**News of the Industry** ..... 90

**Book Reviews** ..... 92

**Personals and Obituaries** ..... 94

**Equipment News** ..... 98

**Regional News** ..... 102



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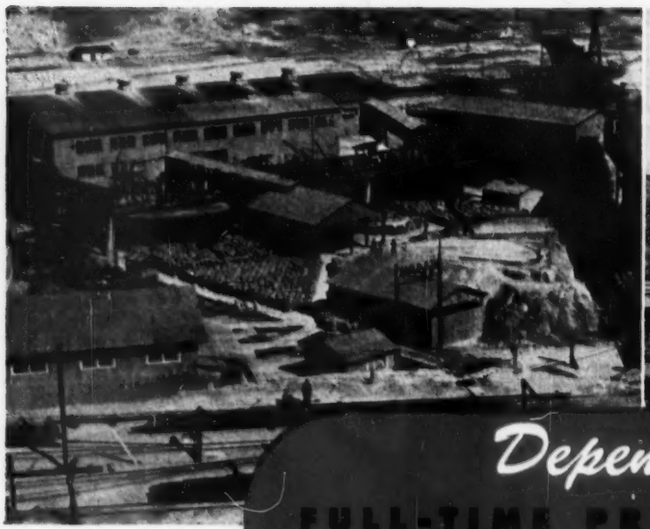
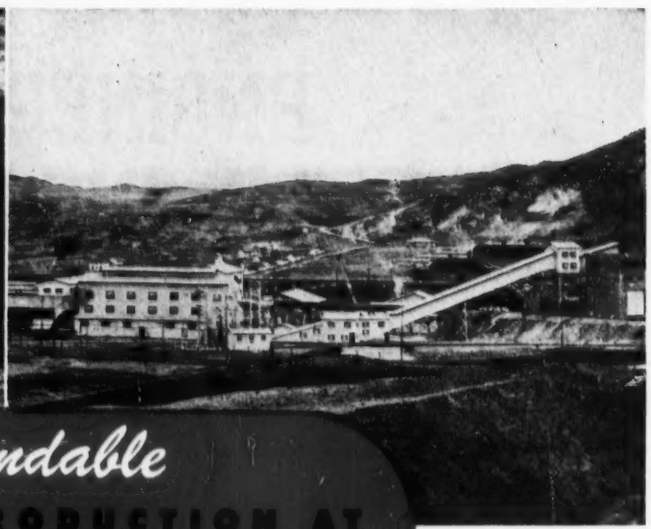


MAHR Concentrator of the Cerro de Pasco Copper Corp. Mines in Peru



Cerro de Pasco Concentrator in the town of Cerro de Pasco, Peru

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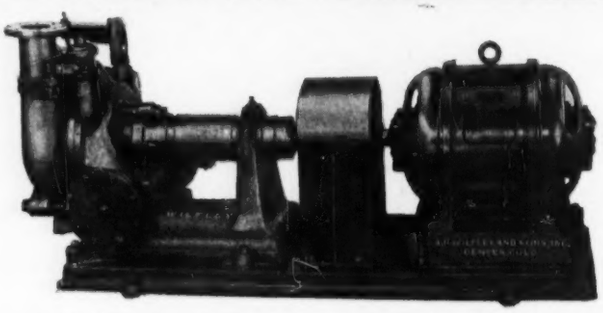

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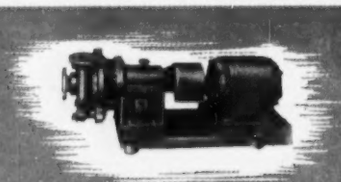

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# ENGINEERING AND MINING JOURNAL

January, 1946

## For a Dynamic Mining Industry

AGAIN WE CALL to the attention of the mining industry that the course of national policy should give mining operations which depend on tariff protection the most serious concern. Also, it seems likely that we are moving toward subjecting the entire mining industry to a government cartel.

Profound emphasis was given to the idea of lower raw-material tariffs during the war, when many manufacturers accepted the idea that they must look to export trade to provide the enlarged markets called for by improved productivity and greater competition. With Bill Batt and, more lately, publicity-hungry Secretary Ickes, shouting from the housetops that we have become a have-not nation in minerals, manufacturers and their labor see an easy way to provide foreign nations with the cash to buy their products, and lower raw-material costs at the same time, by reducing the tariff protection afforded to minerals.

Much public misunderstanding has sprung from statements issued from Bureau of Mines and Geological Survey sources during the past year as to our mineral reserves. The public, like Ickes, does not understand the involved qualifications that surround such estimates. It does not realize the enlargement of mineral resources by technological progress, or the opportunity to rejuvenate the whole reserve outlook by learning to detect concealed deposits. It is told that our commercial reserves of fluorspar and copper are less than 40 years' supply; of zinc, cadmium, gold, lead, and silver, between 10 and 20 years; and of bauxite, vanadium, antimony, tungsten, platinum, mercury, manganese, asbestos, and chromium less than 10 years. Except for bauxite, vanadium, and manganese, it is informed that our submarginal reserves of all these minerals are less than 25 years' supply. Naturally, its immediate conclusion is that what remains of these minerals must be carefully husbanded, which under current thinking means: discourage domestic mining and encourage mineral imports.

The unfortunate result of such a policy will be a tendency to freeze the reserves where they now stand, by retarding discovery, research, and risk-taking. Moreover, wasteful mining is promoted by adverse economic conditions. This would tend to reduce known reserves. Undoubtedly we must look to more dependency on imports. However, it will be a national tragedy if in so doing we hinder the opportunity to continue progress toward maximum utilization of our resources.

The State Department is preparing for an international trade conference in the near future for the purpose of breaking down barriers to international trade. In a comprehensive statement recently made public it proposes: (1) Reducing restrictions imposed by governments, such as tariff, licenses, quotas, exchange controls, and discriminations; (2) Lifting restraints by private combines and cartels; (3) Lessening fear of disorder in primary-commodity markets; (4) Assuaging fear of irregularity in production and employment; and (5) Setting up an international trade organization.

Beyond the significance of the first point, it is interesting to note that the other points lean toward abolishing private attempts to stabilize production and employment, and substituting a great inter-government cartel to achieve the same objectives.

If the mining industry does not like this outlook, what can it do about it? With due recognition of the international aspects of mineral problems, it should demand competence and painstaking care in altering its economic props. It should point out the national danger of a serious loss of mineral self-sufficiency. It should seek a tax outlook under which there will be some sense to undertaking the risks of mineral exploration, development, and research. It should request, in brief, a chance to develop mineral resources fully, instead of being forced to condemn them by wasteful practices that develop under adverse market conditions.

On the other hand, the industry cannot expect to prosper by leaning more and more heavily on Government consideration. There is an internal job to be done also. We must get our share of able, well-trained young men, and give young men better opportunities for accomplishment. We must step up the rate of technological progress, particularly in the fields of exploration and metallurgy. This means putting more into research. Not least, with the economic pressures that will exist, mining management and labor can ill afford to forget their common interest in continuing on all fronts the drive toward improved efficiency.

# TO ENCOURAGE INVESTMENT LA
# VITALIZE INTER-AMERICAN C

# TLATIN AMERICA MUST
# ANCONFERENCE RESOLUTIONS

By
**HOWLAND BANCROFT**
Mining Consultant
New York, N. Y.

THE ENORMOUS SAVINGS extant in the United States cannot logically be invested in Latin-American mineral development unless the countries south of the Rio Grande change the nationalistic trend of recent years. Present policies make amortization and profits uncertain and threaten even the retention of property legally acquired. However, the flow of United States capital into mutually advantageous development would be advisable if the Latin-American republics will vitalize the covenants sanctioned by their representatives at the Inter-American Conference at Mexico City early in 1945.

## Large Sums Available

It is a matter of general knowledge that savings of individuals have increased enormously during the war period. Estimated as considerably in excess of one hundred billion dollars, these liquid savings are in the form of currency, savings accounts, and savings bonds of one form or another. Inasmuch as some seventy-three billions of these increased savings are in the hands of individuals with annual incomes of more than five thousand dollars, it seems reasonable to assume that the owners of some of this capital may be interested in investing in bona fide foreign enterprises. In addition to this huge accumulation of individual savings there are also untold corporation surplus funds. The question is posed: "Is it advantageous to invest any appreciable part of this surplus of private and corporate capital in Latin-American mining enterprises?"

## Nationalism a Barrier

If that query envisions the procedure of the past, i.e., putting our capital to work under our own management; enjoying security of ownership to property legally acquired and relative stability of conditions upon which to estimate profits; receiving equitable treatment in the courts; exercising full freedom in the transfer of profits and the eventual return of capital; employing competent labor with freedom to import such technicians and skilled labor as our management finds necessary; then the answer is definitely in the negative. Such security for the foreign investor as the qualifications stated above would provide no longer prevails in Latin America.

The basic reasons for the change in conditions appear to be:

1. Growth of nationalism throughout Latin America, together with a tendency toward nationalization of those industries having a "public interest," such as mining and oil.
2. Real and imposed exchange difficulties which curb, if they do not freeze, profits in the country of their origin.
3. Restrictive labor laws.
4. Mounting wage inflation in Latin America.

With the exception of wage inflation, these conditions were present in Latin America throughout the thirties, and all of them now prevail. Admittedly, nationalism and nationalization imperil the foreign investor's security of ownership; exchange difficulties deny him the free use of the return on his investment or of the capital itself; restrictive labor laws and inflation so increase the cost of operation as to make profits unpredictable.

**HOWLAND BANCROFT has had extensive experience in several Latin American countries, and during the war served in RFC's Metals Reserve Co. with distinction. In the September 1939 issue of *E.&M.J.* he offered a plan for foreign investments in Latin America that would give domestic interests a chance to participate and eventually acquire control. This plan has since been demonstrated to be sound, and widely acclaimed.**

## Present Stake Is Large

From all this it might appear that an impasse exists, that the unsatisfactory conditions which prevailed in our trade relations with most of Latin America prior to the second World War have only worsened, and that further investments should not be ventured. However, there are some very sound reasons why we must endeavor to resolve the difficulties. One is the considerable capital investment we have already made in Latin America. Another is the implied role which the United States has assumed through her agreement to the terms of the "Economic Charter of the Americas" at the Inter-American Conference on Problems of War and Peace, held in Mexico City during February and March of 1945.

At the end of 1940 the direct investments of our people in Latin-American enterprises amounted to two and three-quarter billion dollars. Of this amount, about one-half billion was invested in 82 mining and smelting activities, and about $572,000,000 in 104 petroleum enterprises. Also, we had over $1,500,000,000 in Latin-American government bonds, of which some 65 percent had been partly or wholly in default since the thirties, which period marked

In any brief discussion of a subject as important as that which is considered here, generalization becomes necessary. However, so numerous and varied are the enterprises, laws, regulations, restrictions, and working conditions in the twenty Latin American countries that all generalizations are not uniformly applicable to each republic. The author is fully cognizant of this fact, and trusts that the reader will be alert to it so that a true perspective of Latin America may be obtained.

With this explanation in mind, the reader is requested to interpret these views as the expression of one who has no pecuniary interest in the further development of Latin American resources, but who, nevertheless, has a very keen interest in furthering a constructive program, in order that the Latin American states may "exercise effectively their natural right to live decently and work and exchange goods productively, in peace and with security."

the end of our bond-floating spree in Latin-American securities. Our total foreign direct investments throughout the world at the end of 1940 amounted to seven billion dollars; our total holdings in foreign dollar bonds, 5½ billions. Hence, about 40 percent of our foreign direct investments and 27 percent of our foreign dollar bonds were respectively in Latin-American ventures and government securities.

## Investments Are Beneficial

These are very substantial sums and percentages, indicating developments of great magnitude. They should be the object of wise and constructive cooperation on both sides. Unhappily, the reverse has been true. Their very size has provoked the alarm of some and the resentment of most Latin Americans, and is a basic cause of their increasing nationalism. The extent of our holdings, the exportation of minerals and oils from their countries, the payments abroad of income returns on the foreign investment—all have been cited by Latin Americans as damaging to their economy. Yet the amounts we have invested are far beyond anything Latin Americans would risk on exploration in their own country. Moreover, they have been unwilling to wait through the long term of years which the foreign investor weathers before the risk he takes has an opportunity of becoming a paying venture. By natural inclination and social background, the Latin of the moneyed class is not a miner. He realizes there are neither the technical skill, the labor supply, nor the transportation facilities within the country to develop the industry in question, nor a demand within the country for a substantial part of the product mined. Nevertheless, he joins in the protest against foreign capital and foreign management—a protest which has continued to increase and has expressed itself not only in highly nationalistic speeches and editorials but in discriminatory legislation in those very countries where our investments are of the greatest significance.

## Interference Not Appropriate

The assertion is made by nationalists that the lack of diversification has been fostered by the foreign investor to enslave the people in a "colonial status"; also, that a single commodity development in mining is even more ruinous than one-crop agricultural economy, because, in removing minerals from a country, national capital is in part removed.

It is true that only a few Latin-American countries export substantial quantities of more than one mineral substance. Therefore, where, except for the single export, the economy of a nation remains as undeveloped as is true of Bolivia and to a large extent of Venezuela, prospects for an enduring improved economic future are dubious in the extreme. However, to rectify even this condition is not an appropriate task for private foreign capital. The job would entail modifications in the social structure, especially as to land tenure and rights of the peon class. The Latin would most strongly and justifiably resent such interference on the part of foreigners. "Single crop" economy is not a system imposed on Latin Americans by the relatively recent advent of the foreign investor, but is a relic impressed on the Latin-American colonies by the Spaniards, and retained by the colonists after freedom from Spain was secured, a means of dominating large holdings and the peons necessary to work them.

Nevertheless, many Latins firmly believe that only by a rigidly nationalistic economy as to export and domestic trade, by native ownership and control of industries (especially those having "a public interest"), and by education of the masses, will their countries ever develop beyond a provincial position.

## A Discouraging Trend

Very frequently action has been taken, not to meet an economic necessity or to develop beneficial conditions, but rather out of hostility toward foreign capital, or in a desire to win political strength, or to get all possible out of the goose short of killing it off. This sentiment has manifested itself in legislation of increasing severity against foreign business and has embraced a long list of extra burdens on operators: regulation of labor exchange; additional taxes; controls on transfer of earnings; extra inspections and many other special decrees, culminating in the late thirties in so-called "expropriations" in Bolivia and Mexico. To many who followed the cases they appeared to have been confiscations. The debates on the cases by some nationalistically inclined Latins made it quite manifest that to them confiscation was entirely justifiable, especially insofar as so-called "public industries" were concerned. Consequently, it is not surprising that in 1939 executives of many United States enterprises were unwilling to enlarge their undertakings in Latin America.

The easiest and surest way for Latin American countries to balance their economies is through intelligent cooperation between themselves and foreign investors. The latter can furnish capital and technical skill, which will gradually become available to local people through cooperative development. Judicious rather than burdensome exercise of taxing power and regulations affecting the choice of key personnel will build up capital and technical self-sufficiency more effectively than economic straightjacketing. Also, the activities of foreign-financed enterprises are conducive to general edu-

cation and the growth of a middle class. Both of these advantages are necessary if the Latin-American republics are to escape the dominance of the landed and powerful few without falling into the toils of dictator-ridden proletarianism. As a result of enlightened cooperation between foreign investors and Latin Americans, the latter can eventually acquire both the ownership of their industries and the skill to operate them. To seek the same ends through application of aggressive nationalism will risk dangers from bungling bureaucracy, technical ineptitude, and hemispheric disunity.

## Huge Wartime Purchases

When war broke out in Europe in September 1939, the certainty of our eventual involvement and the need for strategic minerals which Latin America could supply necessitated submergence of individual grievances. Private industry did not wish to take the heavy additional financial risks attendant upon initiating the war program of purchases in Latin America. Nonetheless, it fell in line when the United States Government, through the Metals Reserve Co., the Foreign Economic Administration, the U. S. Commercial Co., and other United States Government agencies, sought its assistance, and it did a magnificent job of "carrying on."

According to the latest figures released, during the fiscal years 1941 through 1944 inclusive, the Metals Reserve Co. and the United States Commercial Co. spent $868,439,209.97 in Latin America in the procurement of some forty metals, ores, and minerals needed in the war effort. Of this great sum, over half was spent in Chile for acquisition of copper. Of the total, some 94 percent was spent in five countries—namely, Chile, Mexico, Bolivia, Peru, and Brazil, in the amounts noted in the accompanying table, to the nearest thousand dollars.

The total in the table does not include balances remaining on advances against production, nor does it include balances remaining on funds advanced under development programs, both of which represented relatively small totals as of June 30, 1944, and most of which eventually should be liquidated. Nor does the total take into account substantial sums advanced or disbursed by the Export-Import Bank, the Defense Plant Corporation, or by other United States Government agencies which were engaged in procurement

## American Direct Investments in Latin America

### (A) BY COUNTRIES:**

| Area and Country | In Thousands of Dollars 1929 | 1940 | Percentage of Grand Total*** 1929 | 1940 |
|---|---|---|---|---|
| **Latin America:** | | | | |
| **West Indies:** | | | | |
| Cuba | 918,957 | 559,797 | 12.21 | 8.00 |
| Dominican Republic | 69,322 | 41,895 | .92 | .60 |
| Haiti | 14,191 | 12,479 | .19 | .17 |
| Other West Indies | 51,281 | 59,762 | .68 | .86 |
| Total, West Indies | 1,053,751 | 673,933 | 14.00 | 9.63 |
| **Central America and Mexico:** | | | | |
| Costa Rica | 22,166 | 24,726 | .29 | .36 |
| Guatemala | 69,979 | 68,224 | .93 | .97 |
| Honduras and British Honduras | 71,485 | 38,267 | .95 | .54 |
| Nicaragua | 13,002 | 8,858 | .17 | .13 |
| Panama | 28,459 | 36,815 | .38 | .53 |
| Salvador | 29,466 | 11,204 | .39 | .16 |
| Mexico | 682,536 | 357,927 | 9.07 | 5.11 |
| Total, Central America and Mexico | 917,093 | 546,021 | 12.18 | 7.80 |
| **South America:** | | | | |
| Argentina | 331,819 | 387,945 | 4.41 | 5.54 |
| Bolivia | 61,619 | 26,829 | .82 | .39 |
| Brazil | 193,606 | 240,109 | 2.56 | 3.43 |
| Chile | 422,593 | 413,983 | 5.62 | 5.91 |
| Colombia | 123,994 | 111,616 | 1.65 | 1.60 |
| Ecuador | 11,777 | 5,107 | .16 | .07 |
| Guianas (British, French, and Surinam) | 5,688 | 5,965 | .08 | .09 |
| Paraguay | 12,615 | 5,037 | .17 | .07 |
| Peru | 123,742 | 81,597 | 1.65 | 1.16 |
| Uruguay | 27,904 | 10,918 | .37 | .16 |
| Venezuela | 232,538 | 262,376 | 3.08 | 3.74 |
| Total, South America | 1,547,895 | 1,551,482 | 20.57 | 22.16 |
| Total, Latin America | 3,518,739 | 2,771,436 | 46.75 | 39.59 |
| Grand total*** | 7,527,735 | 7,000,342 | 100.00 | 100.00 |

### (B) BY INDUSTRIAL CLASSIFICATION:**

| Industry | In Millions of Dollars 1929 | 1940 | Percentage of Total 1929 | 1940 |
|---|---|---|---|---|
| Manufacturing | 231 | 210 | 6.56 | 7.58 |
| Distribution | 119 | 82 | 3.38 | 2.96 |
| Agriculture | 817 | 359 | 23.22 | 12.95 |
| Paper and wood pulp | ... | ... | ... | ... |
| Fishing fleets and packing | ... | ... | ... | ... |
| Mining and smelting | 732 | 512 | 20.80 | 18.48 |
| Petroleum | 617 | 572 | 17.53 | 20.64 |
| Public utility and transportation | 887 | 962 | 25.21 | 34.72 |
| Miscellaneous | 116 | 74 | 3.30 | 2.67 |
| Totals | 3,519 | 2,771 | 100.00 | 100.00 |

### (C) IN MINING-SMELTING PETROLEUM:**

| Area and Country | Mining and Smelting Number | Value 000 Omitted | Petroleum Number | Value 000 Omitted |
|---|---|---|---|---|
| **West Indies:** | | | | |
| Cuba | 7 | $ 6,636 | 7 | $ 10,195 |
| Dominican Republic | . | .... | 3 | 1,038 |
| Others† | 2 | 1,324 | 8 | 53,722 |
| Totals, West Indies | 9 | 7,960 | 18 | 64,955 |
| **Central America and Mexico:** | | | | |
| Nicaragua | 5 | 2,386 | * | * |
| Mexico | 36 | 168,312 | 15 | 41,970 |
| Others‡ | 3 | 4,211 | 13 | 8,095 |
| Totals, Central America and Mexico | 44 | 174,909 | 28 | 50,065 |
| **South America:** | | | | |
| Brazil | * | * | 6 | 30,177 |
| Chile | 8 | 270,777 | * | * |
| Colombia | * | * | 15 | 75,090 |
| Peru | 4 | 20,182 | * | * |
| Uruguay | . | .... | 4 | 2,429 |
| Venezuela | * | * | 21 | 249,679 |
| Others§ | 17 | 32,604 | 12 | 99,149 |
| Totals, South America | 29 | 329,563 | 58 | 457,064 |
| Total, Latin America | 82 | $512,432 | 104 | $572,084 |

†Includes Haiti; British, French, and Netherlands West Indies.

‡Includes Costa Rica, Guatemala, Honduras and British Honduras, Panama and Salvador.

§Includes Argentina, Bolivia, Ecuador, the three Guianas and Paraguay.

*Signifies included "among others."

**Excerpted from Bureau of Foreign and Domestic Commerce publication, "American Direct Investments in Foreign Countries—1940," Economic Series No. 20.

***Signifies "Grand Total" of *all* American direct investments in *all* foreign countries. Percentages noted thereunder refer thereto.

**Major Expenditures in Latin-American Countries by Metals Reserve Co. and the United States Commercial Co. in Procurement of Metals and Minerals for the War Effort**

| | Expenditures 1941-44 Incl. | Percent of Total |
|---|---|---|
| Chile | $461,508,000 | 53.1 plus |
| Mexico | 137,782,000 | 15.8 plus |
| Bolivia | 131,401,000 | 15.1 plus |
| Peru | 46,696,000 | 5.3 plus |
| Brazil | 42,370,000 | 4.8 plus |
| Total | $819,757,000 | 94.1 plus |

*The balance, a little less than* $50,000,000, *was spent in ten of the remaining* 15 *Latin-American states. Amounts shown to the nearest thousand dollars.*

| | Expenditures 1941-44 Incl. | Percent of Total |
|---|---|---|
| Copper | $472,578,000 | 54.4 plus |
| Tin | 89,258,000 | 10.2 plus |
| Lead | 76,198,000 | 8.7 plus |
| Zinc | 62,649,000 | 7.2 plus |
| Tungsten | 39,002,000 | 4.4 plus |
| | $739,685,000 | 84.9 plus |

*The balance representing approximately* $128,000,000 *was used in procurement of the remaining* 35 *ores, minerals, and metals from* 15 *Latin-American states.*

for the war effort. Expenditures since the close of the fiscal year 1944 will greatly increase the total.

Looking at this picture on the basis of commodities, approximately 85 percent of the total sum was spent in the acquisition of five commodities—i.e., copper, tin, lead, zinc, and tungsten, in the amounts shown in the accompanying table.

Notwithstanding the enormous sums which were poured into Latin America in the acquisition of war minerals and metals, long before the war purchases began to taper off, the same resentment and the same nationalistic policies in claims and in legislation came to mar the "complete cooperation" of the early months of the war. It is interesting and important to note this, because it indicates how seemingly fixed is the nationalistic trend. Has nationalism come to stay?

## Cost Increases Loom

With the close of the war the United States Government has been turning back all its trade activities to private industry. To the difficulties under which the mineral industry was laboring in its relations with Latin America in 1939 a few more have been added.

Mining costs are represented to have increased in Latin America out of all proportion to similar increases in the United States. A review of reports on Chilean and Mexican costs indicates the adverse effect this uncontrolled condition has on income taxes as well as on the ability of companies to continue to operate profitably. Increased cost of Chilean copper production is reported to exceed that of any other country producing large quantities of copper. For example, the average wage paid the miner in the largest copper property in Chile on Jan. 1, 1940, was the equivalent of $1.84 United States currency. By September 1945 this had risen to an equivalent of $5.20 United States currency, an increase of nearly 182 percent. This average wage as of both dates quoted includes base pay, overtime, task bonus, store benefits, and vacation and family allowance. It represents the average daily payment required to keep a workman on the job.

It is not likely that these evils of unbridled wage inflation which, incidentally, the Latin-American countries at the Rio de Janeiro Conference agreed to control, will soon be dissipated. This increase in cost is bound to affect the ability of operators to produce at a profit in Latin-American countries.

## Pact Offers Solutions

Though no panacea is known that will correct the many difficulties under which foreign-owned enterprises are now operating in many parts of Latin America, it behooves us to look about for some remedial measures which assist in the continued and further development of the mineral industries in the American republics.

So fundamentally opposed are extreme nationalism and economic development that the conviction has grown in the minds of many citizens of the United States that Latin America is no longer safe for investments, nor does it offer even a fair gamble. Some measures have been taken here and there to improve the situation, but the basic need has been for the promulgation of an economic policy which would establish sound business relations. The statement of such a policy is to be found in Resolutions 50 and 51 of the Inter-American Conference on Problems of War and Peace, held in Mexico City, Feb. 21 to March 8, 1945.

The Conference adopted 61 resolutions, to which the United States and all other American republics are signatories. Of the particularly pertinent resolutions, 50 and 51 contain statements of economic objectives and principles of such importance to foreign investors and to further development of Latin America that they are quoted hereunder in part for the benefit of those who may not have seen them. Other resolutions of major importance to Inter-American relations, though not bearing directly on economic development, will be brief below in order to set before the reader the scope and limitation of their respective resolutions.

Resolutions 1 and 7 have to do with formalities of organization and with war conditions then in existence, and need not be discussed here.

## Collaboration Stressed

Resolution 8 is of great importance because it attempts to promote reciprocal assistance and American solidarity. It is known as the "Act of Chapultepec," and is not to be confused with Resolution 11, called the "Declaration of Mexico," or with Resolution 51, designated as the "Economic Charter of the Americas." It is a declaration of the integrity, independence, and sovereignty of each American state, its juridical equality, and its solidarity with all other American states in case of attack upon any one state by an aggressor *within* or without the Western Hemisphere; and, further, it provides in detail for the application of sanctions in case of aggression.

Resolution 11, the Declaration of Mexico, asserts the principles gov-

erning the relations among the States of America, and *the necessity for economic collaboration to effect their common prosperity.*

## Universal Mining Code?

Resolution 13 has to do with the incorporation of international law into the municipal law of all the Americas. It occurs to the writer that within the framework of its provisions may be found a way to accomplish considerable betterment in the mining law as it affects inter-American business relations. In the author's opinion, one of the most useful remedial measures which could result from the promulgation of the agreed objectives and principles of the Mexican Conference would be standardization of the basic fundamental characteristics of the mining law of *all* the Americas. Such a procedure could be of inestimable benefit to all operators in the United States as well as to those in Latin America. This suggestion does not contemplate a unification or standardization of the taxes, royalties, or other revenues which might accrue to the several states. However, as regards the basic mining law, there is every reason to support its standardization. As international agreements are effectively operating regarding postal services, sanitation, hygiene and quarantine, and to a limited extent, jurisprudence, it seems entirely reasonable to propose the formulation of a standard mining code to govern mining activities throughout the Americas.

## Industrial Cooperation

Resolution 50 deals with industrial development. It sets forth the principle that "it is of mutual interest for industrialized countries and those not yet industrialized to develop soundly based industries in the latter" . . . by lending "to one another the maximum amount of technical and financial cooperation and to agree upon certain basic principles which will guide their conduct in the attainment of this laudable common purpose." It further resolves that the American republics will promote sound industrial development and exploitation of natural resources, and that the countries most able to do so "will make the greatest effort to the end that there be made available to those who solicit them, ample credits at long term and with equitable rates of interest and amortization." It provides that the American republics *will undertake to afford ample facilities for the free movement and investment of capital,* giving equal treatment to national and foreign capital, except when the investment of the latter would be contrary to the fundamental principles of public interest. Similarly, the American republics will undertake to grant equal treatment to the securities issued and placed by national organizations and institutions and to those issued by organizations and institutions that operate under the laws of other American nations." The resolution further provides "That the American republics intensify their cooperation in the training of the technical personnel required by their economic development; in the *interchange of technical experts of all kinds.*"

## An Economic Charter

Resolution 51, known as the "Economic Charter of the Americas," the most significant resolution of the entire conference, may become of such importance to the further development of Latin America that it is rather fully presented herewith. It consists of a preamble, a declaration of objectives, and a declaration of principles which set forth an economic philosophy characterized by a vision of fair play and an appreciation of the difficulties of the past. It is unique in its proposals of the relationships which should exist between citizens and governments of American states. It suggests "An orderly transition of the economic life of the Americas from war to peacetime conditions, with *joint action* looking to the maintenance of the economic stability of the American republics during such transition period," and "a constructive basis for the sound economic development of the Americas through the development of natural resources; increased industrialization; improvement of transportation; modernization of agriculture; development of power facilities and public works; *the encouragement of investment of private capital, managerial capacity, and technical skills;* and the improvement of labor standards and working conditions, including collective bargaining, all leading to a rising level of living and increased consumption."

The objectives noted above are to be attained in accordance with a number of declared principles, among which are: an international commercial policy to reduce trade barriers and promote the cooperative action which must be taken to stabilize currencies and international investments; government action to prevent practices which interfere with maximum efficiency of production, etc.; *international collaboration to eliminate the excesses of economic nationalism; individual and collective action to assure just and equitable treatment and encouragement for the enterprises, skills and capital brought from one country to another;* to promote the system of private enterprise in production and to take appropriate steps to secure the encouragement of private enterprise *and to remove as far as possible obstacles which retard or discourage* economic growth and development.

A careful perusal of the portions of the resolutions quoted above will demonstrate an agreement on the part of the official representatives of all the American republics on what should be done to promote the industrialization and economic development of Latin America. Within the framework of these resolutions are the suggested remedial measures to the basic objections raised in the introductory paragraph of this article.

## Pact Needs Vitalization

However, the remedial measures have only been suggested. No one of these has been incorporated into a binding agreement between signatories to the "Final Act" of the Mexico Conference on Problems of War and Peace. It is encouraging to find the accredited representatives of all the American republics in accord on what should be done to promote the development of Latin America. However, unless some states or groups of states implement these worth-while objectives and high principles by incorporating the same in actual treaties—i.e., enforceable agreements—the work of the Conference in Mexico City will remain in the category of other excellent proposals which have never been pushed beyond the conversational stage. Also, the further development of Latin America and its resources will become even more speculative than it is at present.

If such remedial actions are taken as have been so clearly outlined and recommended in the foregoing, most of the uncertainties and risks of investments in the further development of Latin-American mineral deposits will have been eliminated, and proposed ventures can be judged solely on their merits as commercial enterprises.

# Diamond Drilling as

**II. E.&M.J. continues its survey of blast-hole diamond-drilling practice. This was begun in the October issue by tabulating the significant details of the work of the 40-odd companies that have been using the diamond drill for mining ore as distinguished from exploring for it. This month the discussion of current practice is extended in a series of short description of the work of certain mining companies selected from the list, amplifying the data already given.**

THE PRACTICE OF STOPING ore with diamond drills instead of with percussion rock drills, although undoubtedly on the increase, is responsible for only a small percentage of the total tonnage or ore produced today in this country, Canada, and the mining world at large. Let there be no misunderstanding regarding this. The total number of companies using it, present and past, is only slightly in excess of 40, so far as such users have divulged the information. Individual companies, moreover, among the 40 or more which have adopted the newer practice, have in no case that we know of, save one, employed it to the total exclusion of the rock drill. The latter is still used by these companies to a varying extent in development work, in stope preparation, and in actual mining, this even where a particular company has adopted diamond drilling as its standard stoping practice. The diamond drill probably never can replace the rock drill in all the different classes of mining.

After the successful and pioneering substitution of diamond drilling by Noranda Mines in the late nineteen thirties for its previous practice of long-hole drilling with rock drills and jointed rods, which was paralleled a little later, as described in the October, 1945, *E.&M.J.*, by the development of electrified diamond drilling in the Soudan mine, under quite different conditions and with a different objective, blast-hole diamond drilling found favor quickly among gold-mining companies in Ontario and Quebec. The number of operators adopting it grew rapidly to more than twenty, and this increase among gold companies would doubtless have continued had the European war not intervened to make things difficult for those who produced only the precious metal.

The practice by this time was finding users among producers of base metals, not only in Canada but in the United States. Noranda, in fact, was an important producer of copper as it had been of gold. Indeed, the circumstance that the practice lends itself readily to drilling ground for blasting months, if not years, ahead of the time when the ore finally must be broken to meet production requirements, stood Noranda in good stead later on, when miners became scarce.

Today, adoption of blast-hole diamond drilling for ore production appears to be increasing slowly. Though a few companies have used it when conditions justified, and then apparently lost interest, the fact is that this method of drilling provides a means for recovering ore under certain special conditions and may, in cases, be used intermittently as required, and in other cases be employed as the standard procedure.

This fact should be borne in mind in considering the data already published in the October 1945 *E.&M.J.* and the additional details given about certain of the companies in the following pages.

## Selected Cases

**United States Vanadium Corporation.** This company mines vanadium ore at Rifle, Colo., and tungsten at Bishop, Calif. Blast-hole diamond drilling was employed at the vanadium mine at Rifle during the summer of 1944 for recovering pillars already blocked out. The work was largely experimental and yielded a small part of the total tonnage. The drilling was done under contract.

The pillars removed had been left by the mining method regularly used in the mine. This consists in driving inclined stopes up the dip with a stoper drill, slushing the broken ore into mill holes, loading into cars with a mechanical shovel, and hauling to the shaft with storage-battery locomotives.

In all, five pillars were mined with diamond drills, giving a total

**STOPE FACE** at the C-7 sublevel in Pine Creek Mine showing the holes of the last vertical ring blasted. The sub-drift is just to the left of picture, as indicated by the converging holes. See cut opposite.

# Applied to Ore Production

of 9,673 tons. They are numbered A, B, C, D, and E, respectively, on the accompanying map of a section of the workings. Pillar C was the first one drilled. See page 60.

During the preceding mining operation, stopes running north from the scram drift had been driven up the dip, which was 30 deg., until the ore became so low in grade that it was no longer profitable. These stopes averaged 50 ft. in length along the slope and were driven 12 to 15 ft. wide every 50 ft. Thus the pillar left was approximately 38 ft. wide and 50 ft. long, bounded on the east and west sides by inclined stopes and on the south by a scram drift about 10 ft. high. Pillars A, B, and C were cut through at the northern end, so that all four sides of each were open. Here the vein averaged 15 ft. in thickness, and stopes were carried at that height.

The diamond drill was set up on a column in the scram drift and the holes were drilled up the dip perpendicular to the strike. Ring drilling was used, the angles of the holes being calculated so as to leave 5 ft. of ground at the end of each. In drilling the first pillar, the rings were spaced at 4-ft. intervals. In the next four pillars they were spaced 5 ft. apart.

The contract price for this diamond drilling was 75c per foot. Most of the work was done with one drill, two men operating it. To speed up the work, two drills were put into service, with two men drilling and a third man helping them. These drillers were inexperienced.

The accompanying table has been compiled to give the results of this experimental blast-hole drilling at Rifle. See page 60.

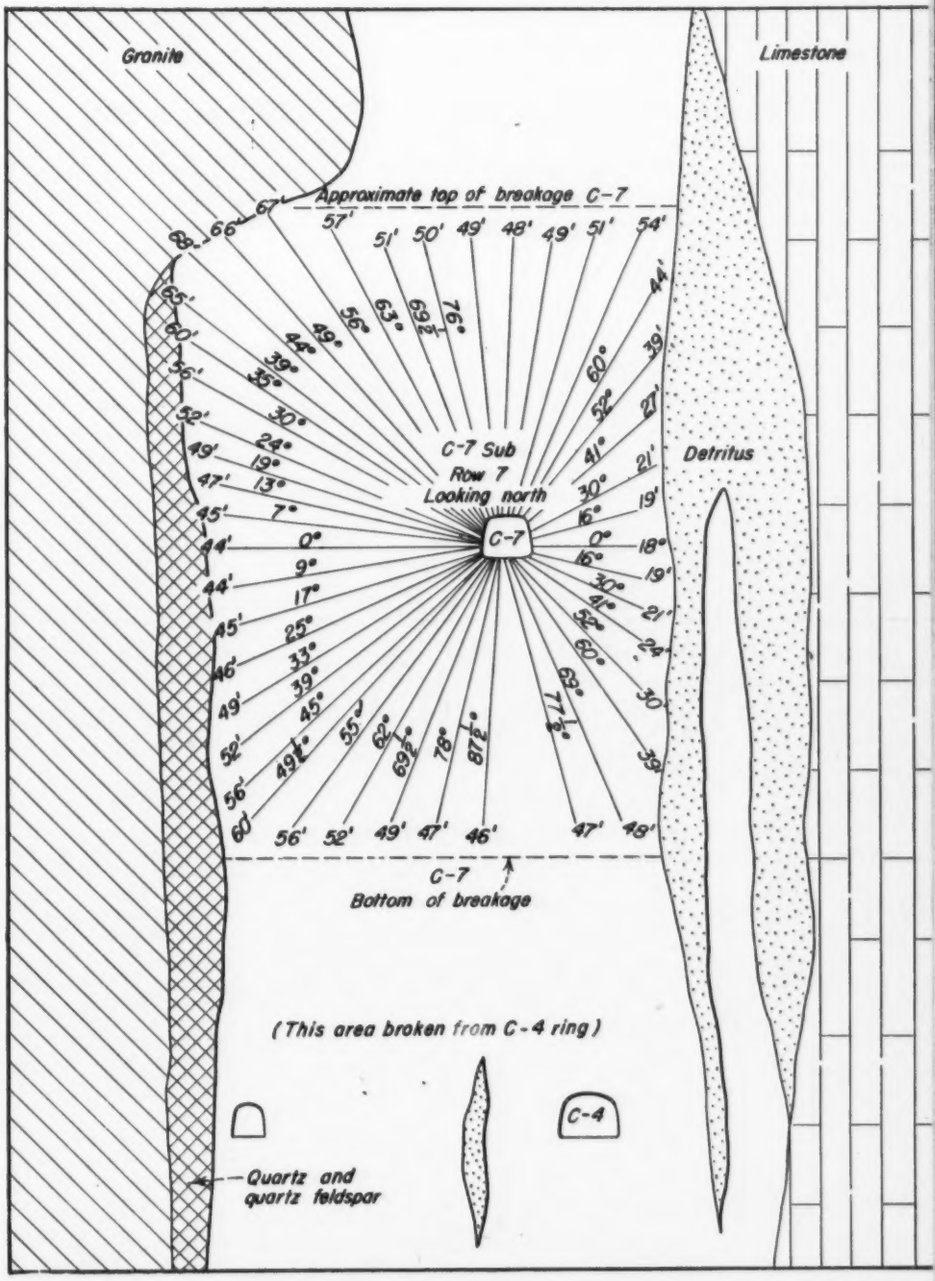
Insufficient records were kept during the drilling of the first, or C, pillar, so the figures for feet drilled per machine shift and tons broken per machine shift were not recorded for that work.

Before starting to drill a pillar, a complete survey was made of it to determine the angle and depth of holes so as to end a hole when the changing wall or footwall was reached. This was done in order to break a minimum of waste. The holes in each pillar varied from 60 ft. to 80 ft. in length. Hole diameter was 1½ in. A concave, non-coring bit was used.

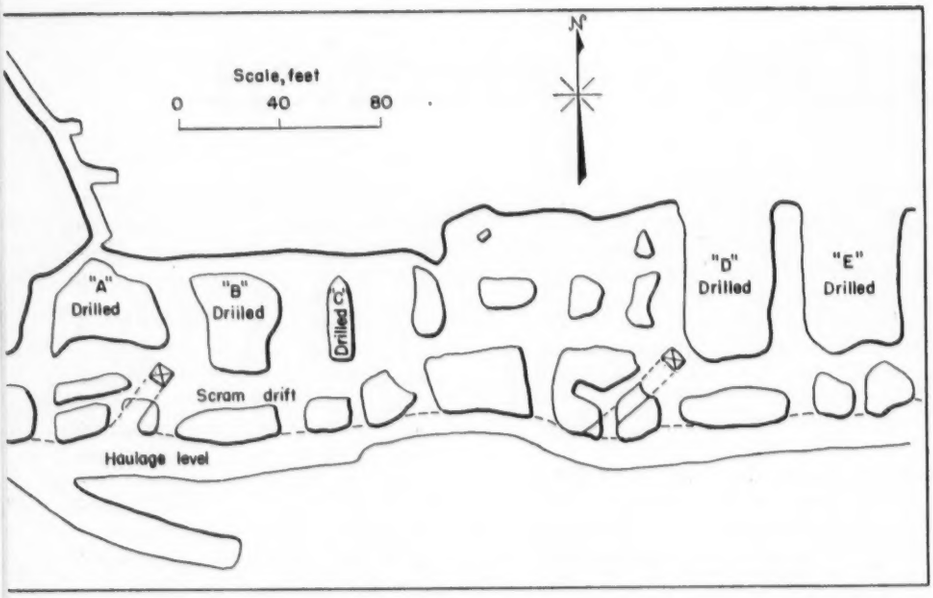
The contractor used a Longyear D6M drill with 5-ft. rods. Air pressure at the receiver was 90 to 100 lb.

At Bishop, in Inyo County, Calif., the United States company is working its Pine Creek deposit primarily for tungsten. The deposit consists of a series of large ore lenses in tactite—found on or near the contact between granite and limestone. Ore minerals are scheelite, molybdenite, chalcopyrite, and bornite, including some silver. The gangue consists largely of garnet, epidote, and other so-called contact metamorphic minerals. The general rocks of the region consist of folded and faulted masses of limestone and argillites along the eastern escarpment of the main Sierra batholith complex.

Three oreshoots form the major deposits, the center one being the




**VERTICAL RING, OR FAN, for diamond-drill blast holes drilled from the C-7 sublevel in Pine Creek tungsten mine of U. S. Vanadium Corporation. Length and angle above or below the horizontal are given for each hole. The character of the adjacent rocks is indicated. The photograph opposite shows the face of the stope at the C-7 sub with the radiating holes of the last ring blasted.**

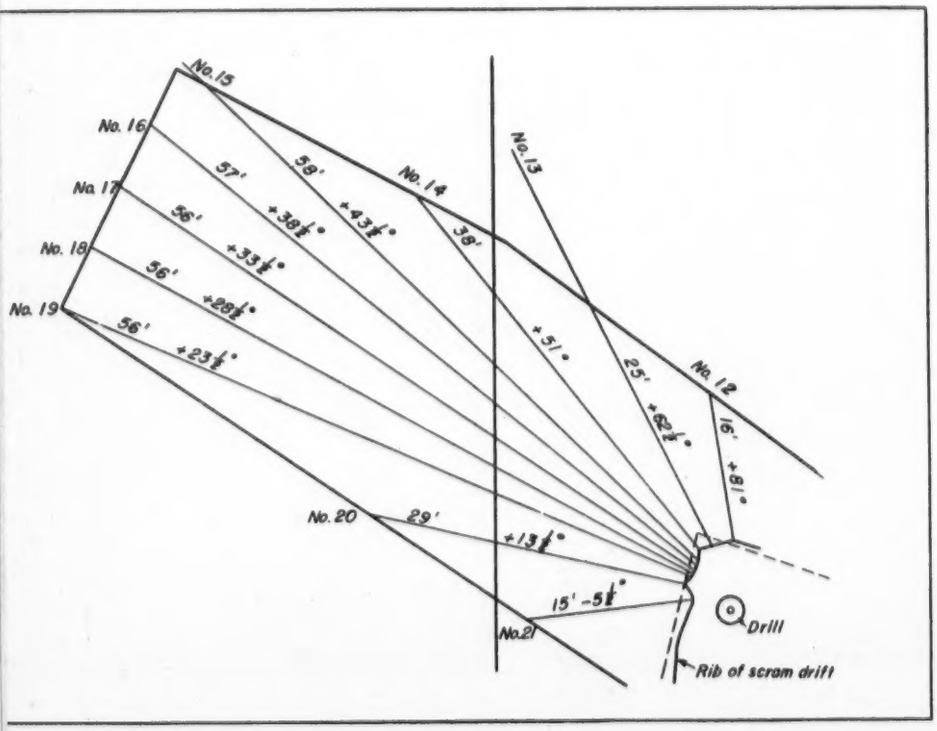



**PILLARS mined by blast-hole diamond drilling in the Rifle vanadium mine of U. S. Vanadium Corporation are indicated at A, B, C, D, and E. The drilling was done as shown in the section shown below. Also see text page 59.**

## Results of Experimental Blast-Hole Drilling at Rifle

| Pillar | No. of Holes | Feet Drilled | Tons of Ore in Pillar | Linear Feet per Drill Shift |
|---|---|---|---|---|
| A | 40 | 1,150 ft. 6 in. | 1,196 | 52.5 |
| B | 35 | 1,264 ft. 4 in. | 1,310 | 57.5 |
| C | 63 | 1,774 ft. 9 in. | 1,508 | ... |
| D | 48 | 1,866 ft. 10 in. | 2,618 | 47.9 |
| E | 56 | 2,091 ft. 6 in. | 3,041 | 52.3 |

| Pillar | Tons per Drill Shift | Tons per Linear Foot | Drilling Cost per Ton, $ | Description of Pillar |
|---|---|---|---|---|
| A | 54.36 | 1.04 | 0.72 | Small size, irregular |
| B | 59.55 | 1.04 | 0.724 | Small size, irregular |
| C | .... | 0.85 | 0.883 | Rings spaced at 4 ft. |
| D | 67.13 | 1.40 | 0.536 | Large size, uniform |
| E | 76.03 | 1.45 | 0.515 | Large size, uniform |




largest, with lengths up to 900 ft. and widths from 0 to 120 ft. The deposits have been developed or drilled 1,500 ft. from the outcrops and probably extend much deeper.

The oreshoots dip and rake steeply and are very continuous, especially in their vertical dimension. Tungsten and molybdenum are partly segregated within the oreshoots, some parts being mined principally for tungsten and other areas chiefly for molybdenum. Tungsten values average around 0.7 percent $WO_3$ in tungsten shoots, whereas the molybdenum shoots range around 0.95 percent $MoS_2$. The general average of ore mined has been in the neighborhood of 0.5 percent $WO_3$ and 0.5 percent $MoS_2$. The tungsten and molybdenum shoots are about 25 percent coextensive.

At this property, blast-hole diamond drilling is regarded as established practice, accounting for 80 percent of production, which amounted to between 400,000 and 500,000 tons of ore in the past year. The method is used in conjunction with sublevel stoping. The holes are drilled from sublevels in horizontal and vertical rings and break to a slot, this being a small shrinkage stope that has been pulled empty. Usually this work is confined to orebodies 25 to 70 ft. wide. One of the rings is shown in the drawing on page 59. Diamond drills are also used for enlarging transfer raises and for various slabbing operations.

In the customary diamond-drill round the longest hole is 70 ft., the average being 50 ft. Hole diameter is 1 3/16 in.

Both coring and concave noncoring bits are employed. Uusually every third hole is cored to determine the width and value of the ore.

The drilling is done under contract at $1.10 per foot. Nine CP5 one-man machines are in service. The work has been under way for 2½ years.

Footage drilled per 8-hr. shift averages 52, ranging up to a maximum of 122 ft. Tons broken per foot of hole average 2.88, the maximum being 6 and the minimum 1.25.

**International Nickel Co. of Canada.** Use of long diamond-drill holes in breaking ore underground is a recent addition to the many mining methods employed by this company in extracting ore. This procedure

**TIER OF HOLES DRILLED from single set-up in scram drift. Drilling was done in rings up the dip perpendicular to strike from column-mounted machine. Rifle mine. See page 60.**

was first adopted in the latter part of 1939 to recover a narrow rib pillar left from former shrinkage operations, and the results were sufficiently favorable to suggest the removal of other pillars by this method.

By the end of 1940, the method had been definitely established as safe and low in cost. The practice was extended to the removal of all types of pillars and to mining low-grade orebodies and ore in other areas where open stoping can be carried on.

Mining by this method has gradually expanded until in the first six months of 1945, 23 percent of the ore broken underground in all the company's operations was thus obtained requiring about 39,000 ft. of diamond drilling monthly.

The method in general is sublevel stoping with ring drilling from the subs or drill drifts, although in some cases in narrow orebodies where ground conditions are good, drilling of vertical holes from benches has been used. In such cases the ore is drawn through grizzlies or boxholes.

In ring drilling the burden is 5 to 6 ft., the spacing at the ends of the holes is 8 to 10 ft., and the length of holes range from 20 to 100 ft. Size of hole is EXT 1½ in.

In bench drilling the burden is the same as in ring drilling, but the spacing is 7 ft. and holes are 50 to 75 ft. long. Size of hole is the same.

In shrinkage stopes, if the ground becomes heavy and unsafe for work with Leyner drills, mining is completed with diamond drills. These machines are likewise used for removing floor pillars and rib pillars.

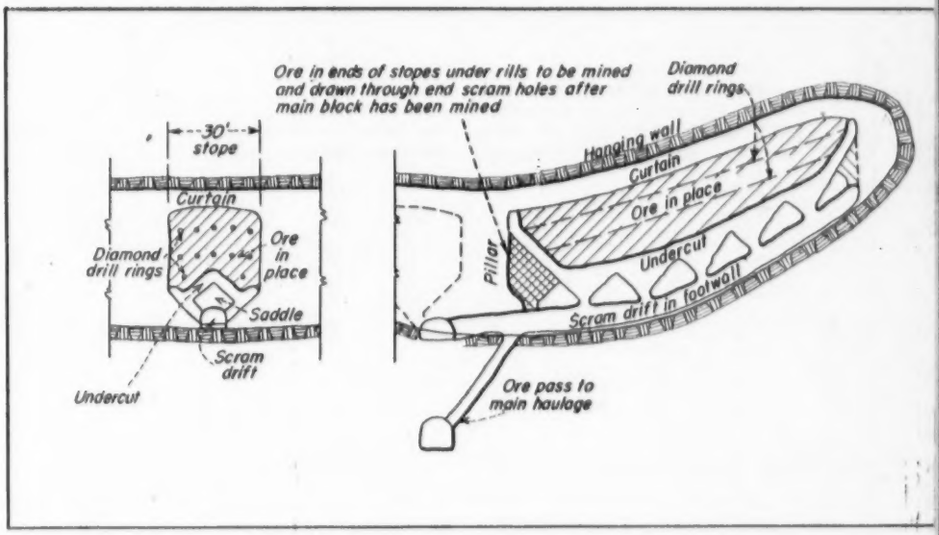
The types and makes of diamond drill used by the company in its blast-hole operations are varied, no machine as yet having been adopted as standard, inasmuch as there has been continuous improvement in drills in the past few years.

The expanding drilling program required a large number of bits, and it was decided that it would be economical for the company to make its own. Late in 1943, a diamond-drill bit-casting shop was set up and by early 1944 was in production.

Footage varies, according to ground conditions, from 35 to 65 ft. per machine-shift. The average is approximately 50 ft.

Polar Forcite gelatin, 75 percent strength, is used, with No. 8 instantaneous electric blasting caps. Powder consumption ranges from 0.20 to 0.35 lb. per ton broken in primary blasting, and from 0.25 to 0.50 lb. per ton in the secondary blasting.

Tons broken per foot of hole varies from 2.5 to 3.5.




**RINGS are drilled at an angle lengthwise with the ore as shown in this stope in Mountain Copper Co.'s Hornet mine. They are 5 ft. apart in elevation and the holes are 6 ft. apart. The latter are about 100 ft. long.**

**Mountain Copper Co.** Sublevel stoping and room-and-pillar mining are used in this company's Hornet mine, in Shasta County. Blast-hole diamond drilling is employed in conjunction with the former method, where it accounts for 60 percent of the tonnage broken. The work has been done under contract, with a CP Model A one-man machine.

In the sublevel stoping the orebody is undercut with power-feed stopers, and the broken ore drops through draw holes, spaced 20 to 25 ft. apart, to a scram drift. Because of varying conditions of the orebody in the stopes, the diamond-drill holes have been drilled in horizontal, vertical, and inclined rings. They are not confined to stopes of certain widths. The largest sublevel stope is 60 ft. in width.

Rings in the stope shown in the illustration are drilled 5 ft. apart, the holes being spaced at 6 ft. The approximate length is 100 ft. The ore in the ends of the stopes under the rills is mined and drawn through the end scram holes after the main block has been mined.

Hole length varies from 60 to 100 ft., the diameter being 1½ in. to permit use of EX bits. The bit is non-coring. Footage drilled per 8-hr. shift is 50.

Adoption of diamond drilling as described has permitted breaking the maximum amount of ore with the least manpower. Tonnage per foot drilled and the tonnage per pound of powder used have both increased, a certain amount of secondary blasting being entailed by the procedure. Dangerous working conditions in the open stopes have been eliminated.

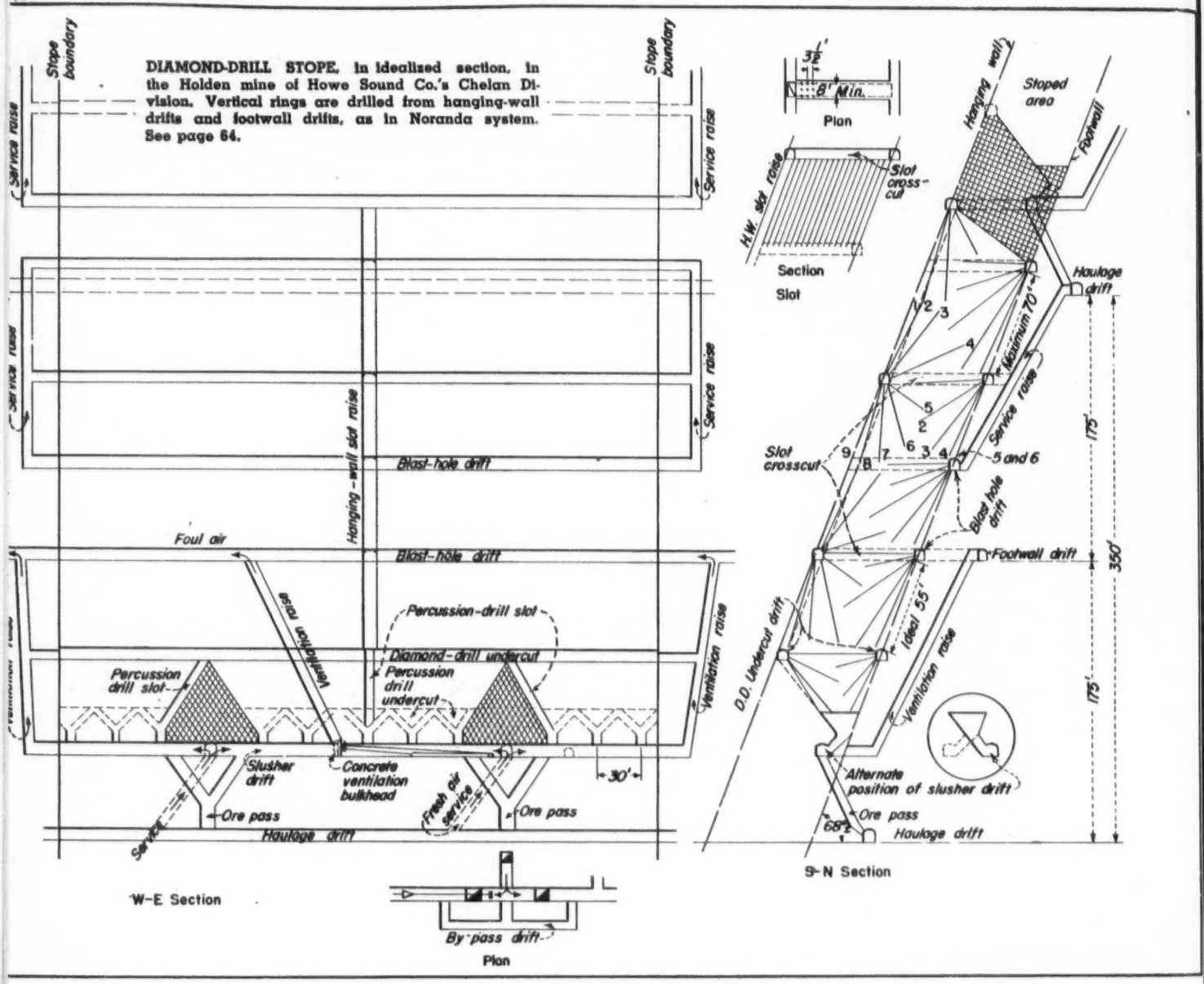
**Bethlehem Steel Co.** Since March

## Diamond Drills Used by International Nickel Co. of Canada in Blast-Hole Work

| Make | Model | No. | Hp. | Rated Capacity EXT Hole, Ft. |
|---|---|---|---|---|
| Longyear | Wolverine | 3 | 13 | 800 |
| Longyear | Gopher | 1 | 9 | 500 |
| Heath & Sherwood | Rand | 4 | 11 | 750 |
| Smith & Travers | U-750 | 7 | 11 | 750 |
| Canadian Pneumatic | No. 5 | 11 | 10 (est.) | 500 |

## Blast-Hole Diamond Drill Bits Used by International Nickel Co. of Canada

| Type | Wt. Set | No. of Stones | Stone Size | Remarks |
|---|---|---|---|---|
| Caving | 4.0 | 300 | 50—100/ct. | Cast type |
| | 4.0 | 200 | 40— 60/ct. | Cast type |
| Pilot blast | 10.0 | 275 | 25— 35/ct. | Cast type |
| Concave | 6.00 | 300 | 40— 60/ct. | Cast type |
| Casing | 7.00 | 114 | 10— 20/ct. | Cast type |
| Reamers | 11.00 | 108 | 10— 15/ct. | Cast Ring type |




**DIAMOND-DRILL STOPE.** In idealized section, in the Holden mine of Howe Sound Co.'s Chelan Division. Vertical rings are drilled from hanging-wall drifts and footwall drifts, as in Noranda system. See page 64.

1945, experimental work with diamond drills has been under way at Cornwall, Pa., in mining the undercut bells into which the ore is block-caved. The procedure is illustrated in accompanying drawings. This method of mining bells is now expected to replace the former shrinkage methods of mining bells as soon as additional equipment and trained drillers are available.

Effort is also being made to replace the panel or block cut-off shrinkage stopes by a method of diamond drilling. See page 64.

Three blast-hole drills are in use. Two are Chicago-Pneumatic CP-5 drills with 10-hp. motors, 2,500 r.p.m. chuck speed and 200, 300, 400, and 500 feed gears. There is one Sullivan HS-15 drill also. The motor is 10 hp. with 3,300 r.p.m. chuck speed and 200, 300, 450, and 600 feed gears. Capacity of the three is 500 ft. of E rod. One No. 12 Sullivan drill is likewise available.

Non-coring bits are used for blast-hole work. These are of the concave type, generally, but occasionally pilot bits are used where ground is harder. Hardhed bits are furnished by J. K. Smit for the most part. Some bits are also supplied by the Wheel Trueing Tool Co. (Truco bits). Reamers are rarely used, as the length of hole drilled (under 50 ft.) does not require a reamer. Stellited adapters are used to replace reamer and core barrel.

Footage is about 60 to 70 per machine-shift for bell drilling, and somewhat higher in cut-off stope work. Maximum footage has been 170 ft. per machine-shift. Average includes moving and all dead work.

Gelex No. 2 has been generally used in blasting. Some experimental work has been done with DuPont's HiVelocity 60 percent. Electric delay detonators are used for the bell shots and Primacord is used for the cut-off stoping.

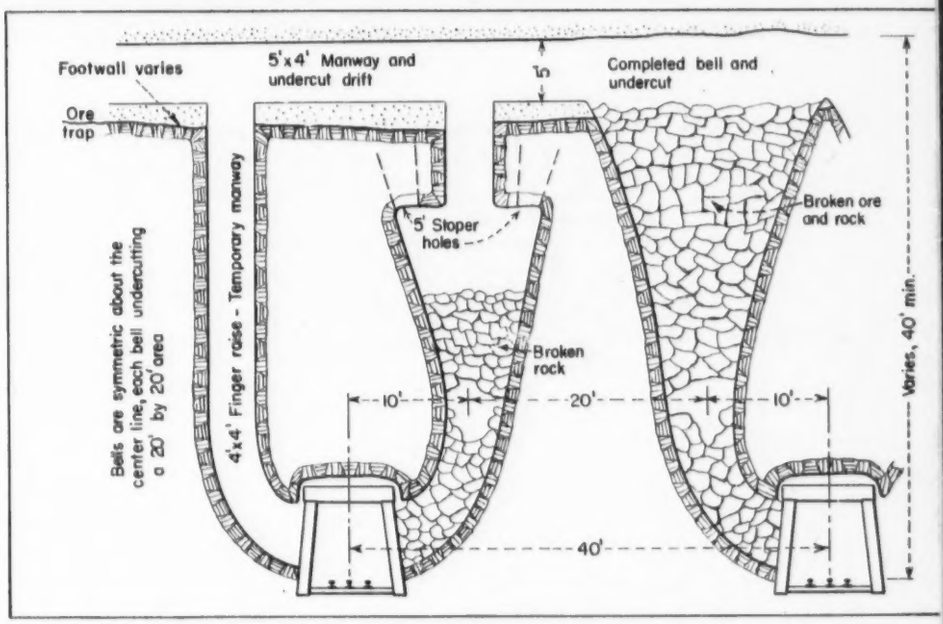
The factor "tons broken per foot of hole" does not apply, due to the block-caving method. However, on the basis of average drilling required per bell and on the average tonnage drawn through each bell, 8 tons is mined per foot of hole.

Average cost for the first four months of blast-hole drilling was $0.402 per foot. Trend is now towards considerably reduced costs.

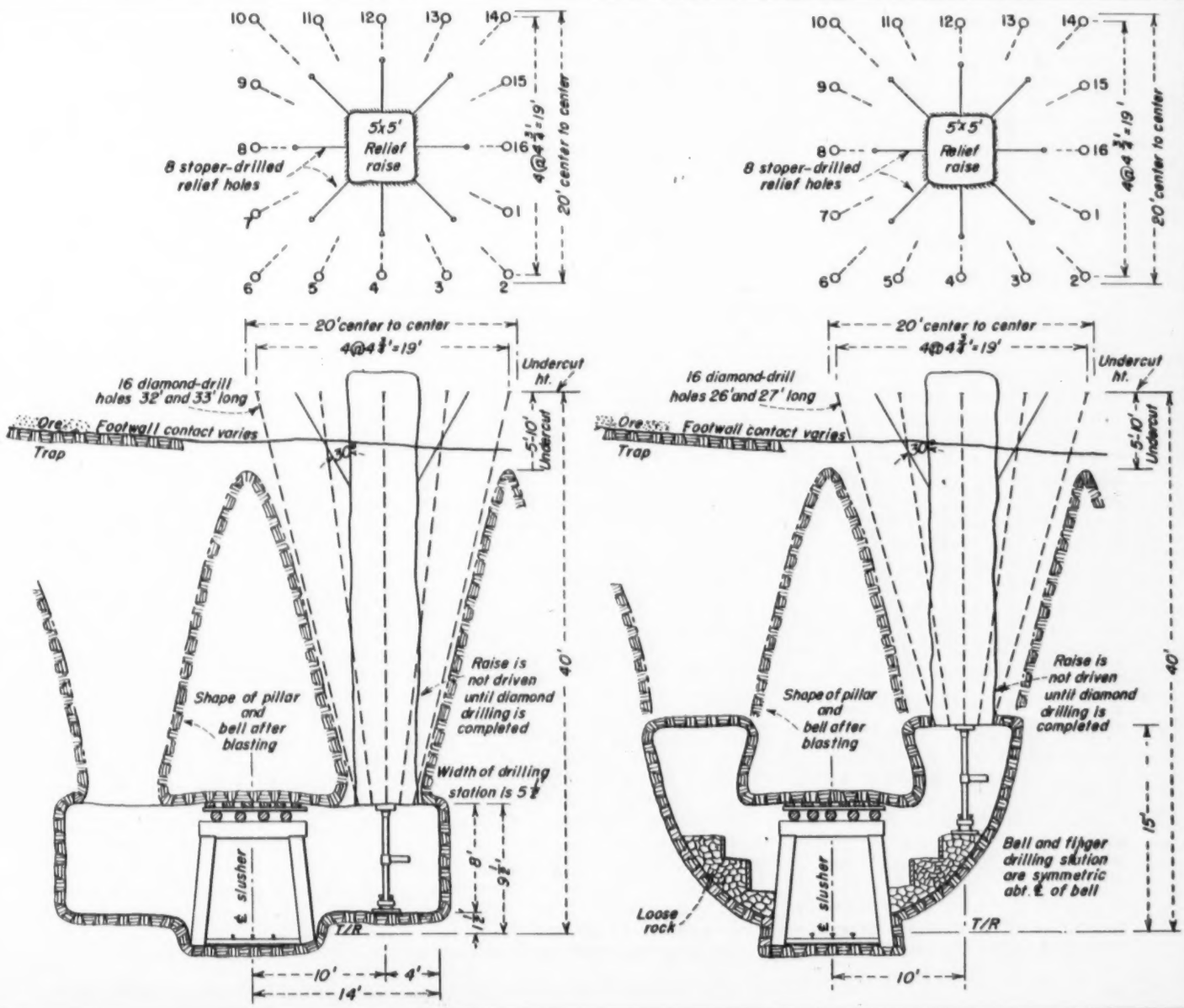
**Republic Steel Corporation.** In the last two years blast-hole diamond drilling has been used by this company to a limited extent. Production of ore by this means amounted to 45,000 tons in 1944 and is estimated at 10 to 15 percent of the mine output in the year just ended. The amount of ore already developed that can be mined in this manner is said to be limited.

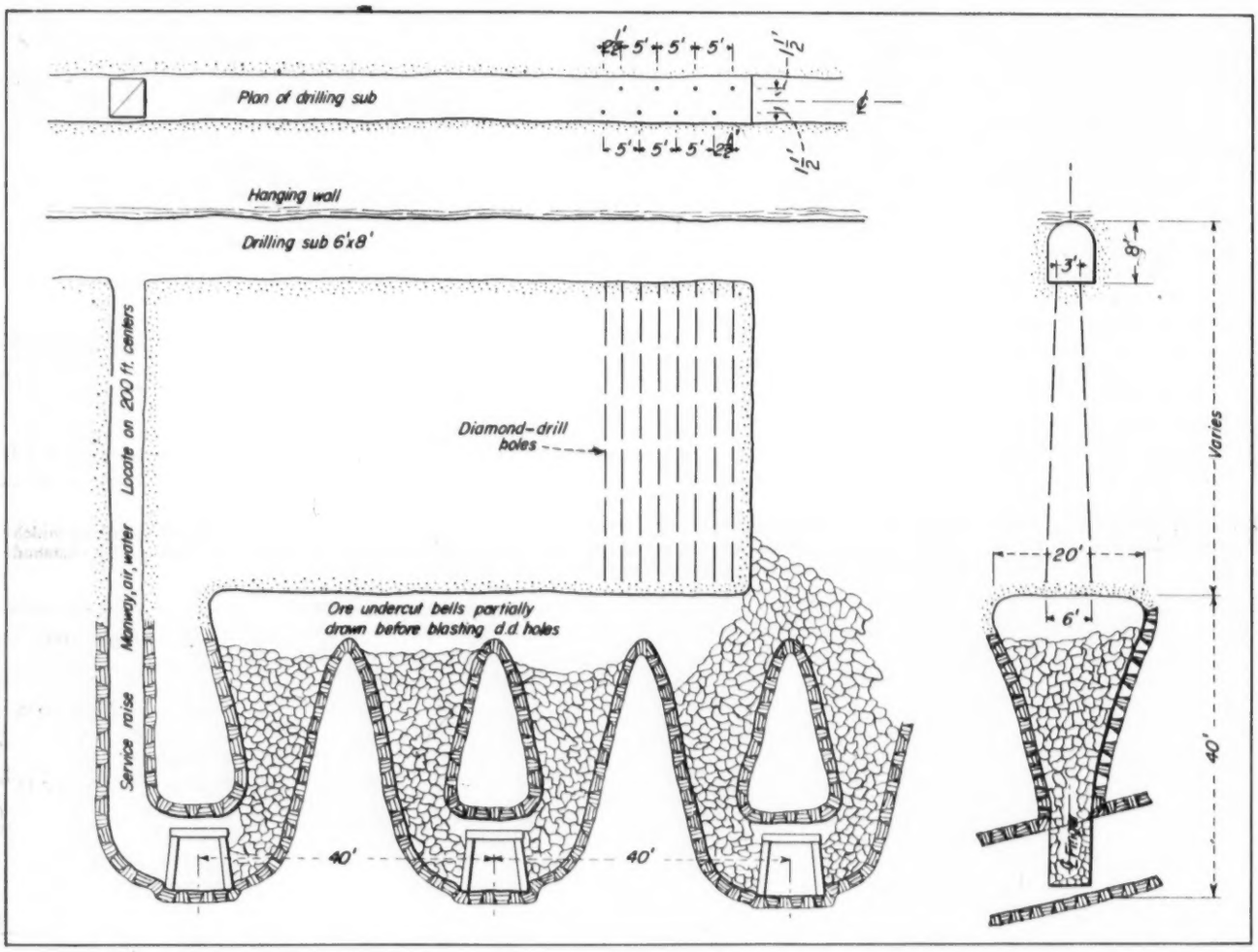
The diamond drilling has been done under contract with three CP5 machines using bits of EX size drilling a 1½-in. hole. A specially developed non-coring bit, of the pilot type cast-set with bortz, has usually been employed. When hard rock is met a coring bit is used.

The diamond drills have been used in conjunction with modified sublevel stoping and in pillar mining. In the first procedure, vertical rings spaced 5 to 8 ft. apart have been drilled after establishng a free face. In one recorded case, for a footage of 2,088, the tonnage broken was 10,000, or 4.8 tons per foot of hole, with an explosive consumption in primary blasting of 0.149 lb. per ton. In a second case, 21,000




**DIAMOND-DRILL BLAST-HOLE MINING as developed by Bethlehem Steel Co. at Cornwall, Pa., for mining the undercut bells into which the ore is block-caved. This has hitherto been done by shrinkage. Above—Shrinkage method of belling. Below left—Belling by diamond drilling from drilling station. Below right—Belling by diamond drilling from finger station.**






**METHOD OF MINING CUT-OFF STOPES by diamond drilling, as proposed for Cornwell operations by Bethlehem Steel Co.**

tons were broken with a footage of 6,300, giving 3.3 tons per foot drilled, this for a powder consumption in primary blasting of 0.2 lb. per ton. Still another case involved the demolition of a large pillar which normally would have been removed by benching, after cutting off the top with air drills. Instead, after the pillar had been cut free at the top, it was broken with 12 diamond-drill holes 115 ft. long drilled vertically from the top, and one shorter hole. Footage totaled 1,416 for a tonnage of 16,500, or 11.6 tons per foot. Drilling required 368 man-hours.

**Howe Sound Co., Chelan Division.** Diamond-drill blast-hole mining has become standard practice at the company's Holden mine, in Washington, where a deposit of low-grade copper-gold ore is worked. Diamond drills are used for all ore-breaking, 100 percent of the output of the mine being thus produced. In addition they have been employed in shaft sinking and in cutting ore and waste pockets in the hoist room.

An idealized section of a diamond-drill stope is shown in the drawing on page 62. The Noranda system is the basis of the pattern. The layouts are either vertical or horizontal ring drilling, with emphasis on the former. Rings are laid out so that a depth of 70 ft. will not be exceeded in any one hole.

Blast-hole diamond drilling at Holden is the successor to the powder-blast mining formerly used. The ore deposit is one that permits the use of a low-cost extraction method. The vein is 30 to 60 ft. wide, with the ore and country rock strong. In this formation the back is good and the walls will stand without backfilling. The large-scale heavy blasting involved in the former method, however, eventually made a change desirable, and mining with diamond drills, with which the company had been experimenting, was adopted and ultimately was applied to all ore breaking.

Drilling as well as loading is contracted. Three types of diamond drills are in use, the CP5 and two Boyles models, one the air-driven B.B.V., Jr., and the other the Boyles electric drill which was developed especially for the blast-hole work at Holden. All are one-man drills, are rated as efficient, and are equipped with a screw feed. The mining company has put a muffler on the exhaust of the CP5.

Bits used are 1 3/16 in. in diameter, non-coring, concave (—30 deg.), and set in powdered metal from a hand-set mold. Holes are 1 13/64 in. in diameter.

Footage averages 45 ft. per machine-shift. In breaking, 1.8 tons per foot of hole is obtained in undercutting and 4.0 tons in stoping.

Thanks to blast-hole diamond-drill mining, production was maintained at Holden during the past year despite an acute shortage of labor, due to a decrease in the number of men underground from 260 to 45. The 45 men that remained were able to send more than 1,600 tons to the mill daily.

# Problems Posed by Surplus Mines, Mills, and Smelters

**R. H. RAMSEY,** Associate Editor

ANY CONSIDERATION of the disposal of Government-owned mining and metallurgical plants ought to begin with an attempt to grasp the size and nature of the problem as a whole. One ought to realize, for example, that right here in this stronghold of free enterprise the Government now owns a substantial portion of the nation's industrial plant, estimated at approximately 20 percent.

That part of Government property (in the form of supplies, products, plant, and equipment) that may eventually be declared surplus, cost somewhere between $100,000,000,000 and $150,000,000,000. No one person or agency knows just what or how much the grand total represents, but this much is certain: "socialist" Britain isn't in it with us when it comes to extent of Government ownership. The difference between the countries lies in the fact that Britain's government is trying to get deeper into industry, whereas ours is anxious to get out. This article was written to tell how the Government proposes to do it.

Under the provisions of the Surplus Property Act of 1944, hereinafter—as the lawyers put it—referred to as "the Act," the Government hopes to avoid some of the upsets and injustice incident to disposal of the first World War's surplus property. To this end, the Act lays down twenty objectives for its administrators to bear in mind and to follow if they can. These objectives are given herewith and deserve study, for they are going to provide the basis for some strange and wonderful dealings in the future.

The question of which of these objectives is most important depends, of course, on where one sits. The American Legion, the CIO, the Department of Justice, the Reconstruction Finance Corporation, the National Association of Manufacturers, the State Department, the Department of Agriculture, and practically any group or agency one can name, have a special and devout interest in one or more of the Act's objectives. Consequently, whatever the Surplus Property Board does, or whatever its agents do, somebody's toes are sure to be trod upon. The unenviable position of managing this nightmarish merchandising job is held by one man, W. Stuart Symington, formerly an electrical equipment manufacturer in St. Louis.

## No Monopoly Wanted

However, in so far as plant disposal is concerned, the objectives that seem thus far to be of paramount importance are: creation of employment and prevention of monopoly. Speed of disposal has been subordinated to those two aims, and anyone desiring to purchase surplus plant and equipment should document his case thoroughly to prove that he can increase employment substantially, and that he is in no danger of becoming dominant in the industry if the sale is made. Having the purchase money handy is not as important, which is proved by the refusal of the Department of Justice to permit the sale to Alcoa of the aluminum plants it has operated for the Government.

So far as most mining companies

### OBJECTIVES OF SURPLUS PROPERTY ACT

**The Surplus Property Act enumerates twenty objectives to be accomplished. They are:**

1. **To give maximum aid in the establishment of a peacetime economy of free, independent, private enterprise;**
2. **To facilitate transition from war to peacetime production;**
3. **To discourage monopoly and strengthen position of small business;**
4. **To encourage and foster employment opportunities;**
5. **To discourage speculation;**
6. **To establish and develop foreign markets;**
7. **To avoid dislocation of the domestic economy;**
8. **To prevent excessive profits being made out of surplus property;**
9. **To dispose of the property promptly;**
10. **To obtain as nearly as possible the fair value of the property disposed of;**
11. **To secure effective use of such property for war and defense;**
12. **To foster and to render more secure family-type farming;**
13. **To afford veterans an opportunity to establish themselves in business;**
14. **To foster distribution of surplus commodities at fair prices;**
15. **To effect broad and equitable distribution of surplus property;**
16. **To achieve full utilization of surplus property at fair prices;**
17. **To utilize normal channels of trade and commerce;**
18. **To promote production, employment, and utilization of productive capacity and natural and agricultural resources of the country;**
19. **To foster the development of new independent enterprises;**
20. **To dispose of surplus government-owned transportation facilities.**

## Government-Owned Mining and Metallurgical Plants

| Plancor No. | Operator | Location | Type of Plant | Annual Capacity | Govt. Investment ($, approx.) |
|---|---|---|---|---|---|
| | | | **ALUMINA** | **Lb.** | |
| 226-X | Aluminum Co. of America | Bauxite, Ark. | Alumina from bauxite | 1,555,000,000 | 39,300,000 |
| 226-AO | Aluminum Co. of America | Baton Rouge, La. | Bayer and sinter processes | 1,000,000,000 | 26,700,000 |
| 1865 | Columbia Metals Co. | Salem, Ore. | Alumina from clay (experimental) | 36,000,000 | 4,300,000 |
| 1831 | Ancor Corporation | Harleyville, S. C. | Alumina from clay (experimental) | 36,500,000 | 3,200,000 |
| 291 | Kalunite, Inc. | Salt Lake City, Utah | Alumina from alunite (experimental) | 72,000,000 | 4,900,000 |
| 1844 | Monolith Portland Midwest Co. | Laramie, Wyo. | Alumina from anorthosite (experimental) | 36,000,000 | 3,300,000 |
| 1371 | Aluminum Ore Co. | Mobile, Ala. | Alumina from red mud | 800,000,000 | ..... |
| | | | **ALUMINUM** | **Lb.** | |
| 226-K | Aluminum Co. of America | Jones Mills, Ark. | Pig aluminum | 128,000,000 | 29,300,000 |
| 226-A4 | Aluminum Co. of America | Riverbank, Calif. | Pig aluminum | 96,000,000 | 11,600,000 |
| 226-LA | Aluminum Co. of America | Torrance, Calif. | Pig aluminum | 160,000,000 | 24,000,000 |
| 226-A3 | Aluminum Co. of America | Burlington, N. J. | Pig aluminum | 96,000,000 | 16,800,000 |
| 226-A1 | Aluminum Co. of America | Maspeth, N. Y. | Pig aluminum | 246,000,000 | 32,600,000 |
| 226-NY | Aluminum Co. of America | Massena, N. Y. | Pig aluminum | 96,000,000 | 19,100,000 |
| 226-O | Aluminum Co. of America | Troutdale, Ore. | Pig aluminum | 128,000,000 | 18,900,000 |
| 226-S | Aluminum Co. of America | Spokane, Wash. | Pig aluminum | 192,000,000 | 22,300,000 |
| 245 | Olin Industries, Inc. | Tacoma, Wash. | Pig aluminum | 41,500,000 | 6,200,000 |
| | | | **MAGNESIUM** | **Lb.** | |
| 707 | Permanente Metals Corp. | Manteca, Calif. | FeSi (Pidgeon) process | 20,000,000 | 6,200,000 |
| 547 | New England Lime Co. | Canaan, Conn. | FeSi (Pidgeon) process | 10,000,000 | 4,800,000 |
| 264 | Mathieson Alkali Works, Inc. | Lake Charles, La. | Electrolytic process | 54,000,000 | 48,600,000 |
| 449 | Ford Motor Co. | Dearborn, Mich. | FeSi (Pidgeon) process | 40,000,000 | 10,400,000 |
| 477 | Dow Magnesium Corp. | Marysville, Mich. | Dow electrolytic process | 72,000,000 | 21,600,000 |
| 201 | Basic Magnesium, Inc. | Las Vegas, Nev. | MEL electrolytic process | 112,000,000 | 140,000,000 |
| 546 | Amco Magnesium Co. | Wingdale, N. Y. | FeSi (Pidgeon) process | 10,000,000 | 7,000,000 |
| 244 | Diamond Magnesium Co. | Painesville, Ohio | Dow electrolytic process | 36,000,000 | 14,600,000 |
| 669 | Magnesium Reduction Co. | Luckey, Ohio | FeSi (Pidgeon) process | 10,000,000 | 4,700,000 |
| 81 | Dow Chemical Co. | Freeport, Texas | Dow electrolytic process | 18,000,000 | 8,200,000 |
| 243 | Dow Magnesium Corp. | Velasco, Texas | Dow electrolytic process | 72,000,000 | 55,100,000 |
| 265 | International Min. & Chem. Corp. | Austin, Texas | Dow electrolytic process | 24,000,000 | 14,600,000 |
| 571 | Electro Metallurgical Co. | Spokane, Wash. | FeSi (Pidgeon) process | 48,000,000 | 16,100,000 |
| 477 | Dow Magnesium Corp. | Ludington, Mich. | $MgCl_2$ as cell feed | 380,000,000 | 16,800,000 |
| 265 | International Min. & Chem. Corp. | Carlsbad, N. M. | $MgCl_2$ as cell feed | 61,800,000 | 3,800,000 |
| | | | **IRON ORE—MINING AND PROCESSING** | **Tons** | |
| 662 | Alan Wood Steel Co. | Ringwood, N. J. | Mine and concentrator | 418,400 | 3,916,000 |
| 262 | Republic Steel Corp. | Port Henry, N. Y. | Mine, mill, sinter plant | 1,120,000 (ore)<br>784,000 (sinter) | 11,782,000<br>..... |
| 2113 | Scotia Mining Co. | Scotia, Pa. | Mine, heavy-media plant | 250,000 | 688,000 |
| 346 | American Rolling Mill Co. | Houston, Tex. | Mine | 150,000 | 456,000 |
| 763 | Lone Star Steel Co. | Daingerfield, Tex. | Mine, mill, sinter plant | 438,000<br>(pig iron) | ..... |
| 1098 | Ozark Ore Co. | Iron Mountain, Mo. | Mine and mill | 250,000 | 850,000 |
| 260 | Republic Steel Corp. | Spaulding, Ala. | Mill, sinter plant | 420,000 (conc.)<br>392,000 (sinter) | 826,000<br>2,414,000 |
| 475 | Jones & Laughlin Ore Co. | Stor Lake, N. Y. | Mill, sinter plant | 1,120,000 | 6,985,000 |
| 259-W | Republic Steel Corp. | Warren, Ohio | Sinter plant | 392,000 | 7,083,000 |
| 259-Y | Republic Steel Corp. | Youngstown, Ohio | Sinter plant | 350,000 | ..... |
| 759 | American Rolling Mill Co. | Hamilton, Ohio | Sinter plant | 540,000 | 793,000 |
| 1648 | National Lead Co. | Tahawus, N. Y. | Magnetite sinter plant | 600,000 | 1,957,000 |
| 1514 | Republic Steel Corp. | Warren, Ohio | Sponge-iron plant | 35,000 | ..... |
| | | | **CHROMIUM AND MANGANESE** | **Tons** | |
| 133 | Anaconda Copper Mining Co. | Columbus, Mont. | Chromite mine and mill | 360,000 | 3,793,000 |
| 587 | Anaconda Copper Mining Co. | Columbus, Mont. | Chromite mine and mill | 720,000 | 8,323,000 |
| 1501 | Southwestern Engineering Co. | Marshfield, Ore. | Chromite concentrator | 144,000 | 581,000 |
| 1804 | Domestic Manganese & Dev. Co. | Butte, Mont. | Manganese mill | 40,000 | 297,000 |
| 402 | Manganese Ore Co. | Las Vegas, Nev. | Manganese leaching plant | 90,000 | 7,632,000 |
| | | | **COPPER, LEAD, ZINC** | **Tons** | |
| 332 | Castle Dome Copper Co., Inc. | Miami, Ariz. | Copper mine and mill | 4,320,000 | 14,587,000 |
| 434 | Phelps Dodge Corp. | Morenci, Ariz. | Copper mill and smelter | 7,200,000 | 27,062,000 |
| 434-E | Phelps Dodge Corp. | El Paso, Tex. | Copper refinery | 60,000 | 2,730,000 |
| 1724 | St. Louis Smelt. & Ref. Co. | Fredericktown, Mo. | Mill—lead ore, cobalt, copper, nickel ore | 230,000 | 692,000 |
| 1906 | United Mining & Milling Co. | Platteville, Wis. | Lead-zinc mill | 450,000 | 256,000 |
| 327 | Am. Zinc Co. of Illinois | Monsanto, Ill. | Electrolytic zinc plant | 17,000 | 6,299,000 |
| 327 | Am. Zinc Co. of Illinois | Fairmont City, Ill. | Zinc, lead and cadmium smelter | 7,200 | |
| 1023 | Eagle-Picher M. & S. Co. | Henryetta, Okla. | Zinc retort and Waelz plant | 13,000 | 583,000 |
| 971 | Hegeler Zinc Co. | Hegeler, Ill. | Cadmium and zinc plant | 12,880 | 848,000 |
| 1327 | Corod Minerals Corp. | Marion, Ky. | Zinc, lead, fluorspar mill | 35,000 | 252,000 |
| 1251 | Am. Zinc Co. of Illinois | Dumas, Tex. | Retort zinc plant | 17,000 | 894,000 |
| 1842 | Athletic M. & S. Co. | Ft. Smith, Ark. | Zinc oxide Waelz plant | 75,000 | 471,000 |
| 1033 | Panaminas, Inc. | Paytes, Va. | Zinc, lead, copper mill | 36,000 | 115,000 |
| | | | **MISCELLANEOUS METALS AND MINERALS** | **Tons** | |
| 64 | Tin Processing Corp. | Texas City, Tex. | Tin smelter | 96,000 | 6,589,000 |
| 495 | Tantalum Defense Corp. | Chicago, Ill. | Tantalum oxide and metal | 35 | 5,342,00 |
| 1283 | Minerva Oil Co. | Cave-In-Rock, Ill. | Fluorspar, zinc mine and mill | 60,000 | 418,000 |
| 1663 | Western Fluorspar Corp. | Northgate, Colo. | Fluorspar mill | 180,000 | 157,000 |
| 1060 | Zuni Milling Co. | Los Lunas, N. M. | Fluorspar mill | 36,000 | 234,000 |
| 1196 | Wah Chang Trading Corp. | Glen Cove, N. Y. | Tungsten mill | 15,000 | 672,000 |
| 921 | U. S. Vanadium Corp. | Salt Lake City, Utah | Tungstate plant | 17,000 | 421,000 |
| 293 | Vanadium Corp. of America | Monticello, Utah | Vanadium oxide plant | 36,000 | 1,251,000 |
| 1716 | Clifton Products, Inc. | Painesville, Ohio | Beryllium oxide plant | 500 | 284,000 |
| 696 | Beryllium Corp. of Pa. | Temple, Pa. | Beryllium alloy plant | 2,000 | 2,439,000 |
| 1254 | Benjamin Franklin Graphite Co. | Chester Springs, Pa. | Graphite mine and mill | 2,500 | 408,000 |
| 1073 | Ferro Enamel Supply Co. | Cleveland, Ohio | Nickel and cobalt | 700 | 1,084,000 |
| 1255 | Brush Beryllium Co. | Lorain, Ohio | Beryllium alloy and metal | 1,000 | 875,000 |

are concerned, this anti-monopoly provision will probably not be invoked, because few of the available facilities could establish a monopoly. In disposing of mining and metallurgical plants, other than aluminum, magnesium, iron and steel, the questions arising will be based largely on the company's position in its field, on probable employment offered, and on ability to make effective use of the plant to be sold.

When plants or equipment are no longer of use to the Government, they are declared surplus by the Army, the Navy, the WPB, or other agencies, and are given to the Surplus Property Administration to dispose of. Certain things—ships, metals, and minerals, for example—are handled differently, but the bulk of the Government's property goes through the SPA. The Reconstruction Finance Corporation then takes over the actual selling job, subject to the regulation and approval of the SPA.

## Report to Congress

Congress, however, retains an interest in the matter, for Sec. 19 of the Act requires that the SPA must report to Congress on each of 12 categories of surplus property, which include plants and facilities for: aluminum, magnesium, iron and steel, aircraft, synthetic rubber, aviation gasoline, other chemicals, electrical equipment, and, in addition, shipyards, oil pipe lines, transportation facilities, and all patents, techniques, or inventions necessary to operate the foregoing. No plants costing less than $5,000,000 need be reported, however.

The iron and steel, the aluminum, and the magnesium reports are already in. They include descriptions of the properties, an outline of the problems involved in their disposal, and some various schemes by which disposal might be made in accordance with the act.

Thirty days after filing its final report to Congress (in most of the 12 categories), the SPA can proceed to dispose of plants covered in the report, unless Congress decides otherwise. But there is one more hurdle: As soon as negotiations begin for sale of any property costing the Government $1,000,000 or more, the SPA must notify the Attorney General of the "proposed disposition and the probable terms or conditions thereof." The Attorney General then has 90 days to make up his mind as to whether or not the proposed deal would violate the anti-trust laws.

Perhaps it would be useful to review what can happen to a plant owned by the Government and now operated by a private company under lease. One of these days the Government will send the company cancellation notice, the terms of which are already embodied in an operating contract. Ten days after this notice is received a 90-day period begins during which the lessee can exercise an option to purchase the plant. An interim lease may be granted during a short-term period to allow a manufacturer to investigate the problems of conversion and to decide his interest in acquiring or leasing the plant on a commercial basis. The 90-day option continues to operate during this period.

The terms for purchase of a plant are not fixed and are open to negotiation, but the price of a plant, under the lessee's option, is fixed. The price has been set at the cost of replacement less depreciation, as follows: 5 percent per year on plant buildings; 12 percent per year on machinery and equipment; 25 percent per year on "loose tools," in which are included items all the way from hammers to trucks. Few companies have exercised this option, although some particularly desirable facilities have been sold that way. A property so purchased cannot be resold within three years.

## Plant Leasing

If the lessee chooses to enter in a commercial lease, he faces a new situation: He must pay the Government a flat rental based on the replacement cost less depreciation, and he must also assume all risks and obligations, such as taxes and insurance. Some such leases, where demand for the product is uncertain, tie the rental to production, so that rent is paid only when the plant is operating.

The RFC may also find it desirable to stipulate in some leases some minimum rate of employment or other performance standard, below which the lease can be cancelled. Each lease, it is clear, is a separate case, and no standard policy can be laid down, except that the deal must be compatible, if humanly possible, with the objectives of the Act.

If the lessee is interested in acquiring the plant but considers the option price too high, he must renounce his option before a deal can be negotiated on other terms. If he fails to exercise this option or to undertake a new negotiation within 90 days, the plant can be purchased or leased from RFC by anyone, provided the Congress and the Department of Justice, as noted previously, have nothing against it.

The Act gives priority in purchase of surplus plants to Federal, state, and local governments or their instrumentalities, and to small business. However, this feature probably won't have much effect in sale of mining and metallurgical property.

## How to Buy

A company wishing to buy or lease a plant declared surplus should follow more or less this procedure. Its executive should arrange with the RFC agency and the operating company, if there is one, to inspect the plant. The object should be to prepare a detailed plan of how the plant will be used, what changes might be required, how much they would cost, how many people will be put to work, where and how the product will be sold, how the plant could be paid for.

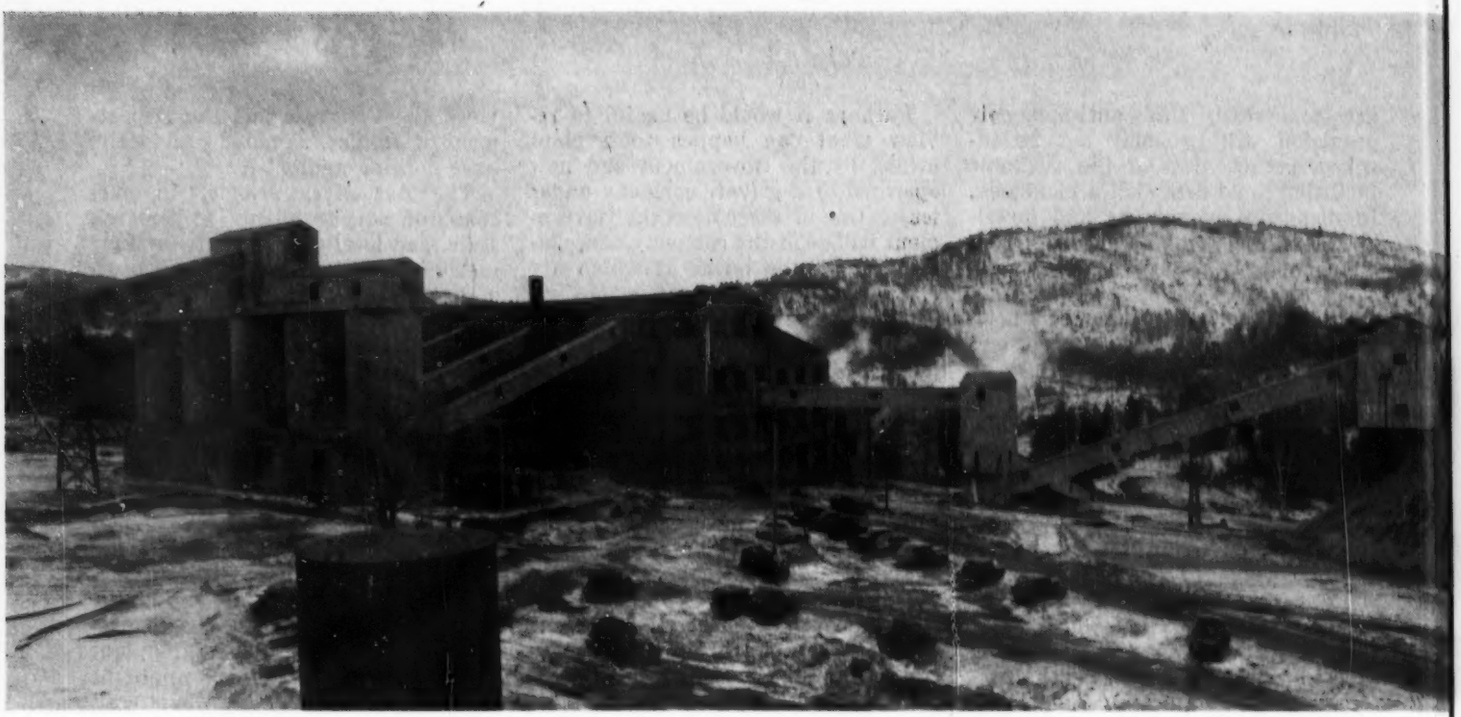
Armed with this material, the executives can begin discussions with the RFC's agents as to an appraisal of the plant's value, its price, and the terms of sale. The length of negotiations depends entirely on how anxious the company is to get the plant and how well equipped it is to handle the deal. The RFC will lend money at 4 percent to rehabilitate or reconvert a plant, if it seems worth while, and RFC negotiators are anxious to close deals if they can. However, loans are made on a sound business basis and are not to be considered a new kind of WPA.

Up to the present, in fact, RFC's negotiators have been careful to insist on obtaining prices that were fair to both seller and purchaser. Prospective buyers who hoped to buy fine new plants for 10c on the dollar have been disappointed.

## What Is Available

One point I would like to make strongly here is that there is no place where the ordinary citizen or mining company can go and buy a surplus camera, washing machine, rock drill, or bulldozer directly from the Government. A veteran can, under certain conditions, but no one else.

All such items of consumers' goods or construction and mining equipment are being sold through regular trade channels with prices fixed by the OPA. Even if you could buy a surplus Army truck, you probably wouldn't want it after you saw it. The Government sells such equip-



**IF PRESENT HIGH-LEVEL STEEL CONSUMPTION** is sustained, the chances for continued operation of modern iron-ore concentrators will be good. This plant at Port Henry is rated to handle 1,120,000 tons of iron ore and produce 784,000 tons of sintered concentrates per year. Machinery and equipment in the plant include crushers, feeders, magnetic separators, conveyors, sintering machines, and filters.

ment "as is," and extensive overhauling is almost always required. That is why you can't buy the bulldozers that are "stored" in the empty lot down the block. Dealers get first crack at them.

## Cannibalizing Plants

Going a step higher in the scale, one meets the question as to whether or not the RFC would be willing to sell (or permit removal for use elsewhere) part of the equipment of a metallurgical plant.

The RFC does "cannibalize" plants in cases where it believes that there is not a good chance to sell plant and equipment together. For the present, the attitude toward cannibalizing metallurgical plants has been conservative. For example, a mining company, which has been operating a Government-owned flotation plant, recently asked permission to move some of the idle flotation cells to a new mill the company was constructing. To preserve the original plant as a usable entity, the RFC refused permission for the shift.

## Plants for Sale

Accompanying this article is a list of Government-owned mining, milling, and smelting plants all of which now are, or will in the future, be up for sale. Many of them are still operating; the copper, lead, and zinc properties, for example, and the Texas tin smelter. But the end of the Premium-Quota Plan next June will probably thrust many of these plants into difficulties. The RFC calls attention to them now so that interested parties may begin planning what they might do with them, but it must be remembered that most of these plants are not now for sale and some may never be available to outside parties. The present operators will have first chance at them.

## Future of Mining Plants

Those charged with disposing of mining and metallurgical plants face a most unusual problem. As any one of us knows, a mill is tied to its orebody, and a chrome mill in Montana cannot sensibly be offered for sale, as a unit, to anyone who does not want to come there and treat chrome ore.

On the other hand, some factories are easily converted. For example, a plant in the East that was built to make fine quality nickel-copper tubing can be converted by moving the machinery to an adjoining building to make brass or aluminum alloy tubing and the building used to house bottle cap manufacturing equipment. However, if someone wants to buy a concentrator designed to treat ores from a given orebody, it would not be logical without buying the orebody too. For example, one cannot easily convert a copper flotation plant to anything else, particularly a gold cyanidation mill.

Furthermore, if the Government operation turned out well, as did the Treasury Tunnel and the Urad molybdenum mine, the lessees will be glad to purchase the facilities, as these two were purchased, at 100 cents on the dollar if need be. But if rich ore was not found, or if the process did not turn out well, no amount of eloquence will turn up a ready purchaser. In such a case the RFC may be willing to spend a little money for exploration or research if an attempt to enhance the value of its property seems justified.

This unique character of mining and metallurgical plants, it seems to me, is not as well understood in all branches of the RFC and the SPA as it should be. For many such plants, the only salvation will be the entrance of the United States into a period of prosperity so abundant that it will drive all suppliers of raw materials at top speed. If that happens, much of the extra capacity in ferrous and non-ferrous industries could be used.

## Light Metals

The country's capacity for making aluminum and magnesium now so greatly exceeds any probable demand that one cannot help regarding some of the plants as surplus to any discernible needs. Facing formidable competition from Alcoa, newcomers in aluminum production have been more inclined to lease than to buy.

Of course, regional interests may modify the handling of aluminum

plants to some extent. For example, the alumina-from-clay experimental plant (Plancor No. 1865), in Oregon, will be kept going by the Government in order to learn more about the process. The Pacific Northwest in general has a strong interest in light-metals industries because of the cheap electric power available there, a necessity in producing aluminum and magnesium.

In the field of magnesium, there is little chance of anyone competing with the Dow process, so far as low production cost is concerned. The only companies that stand a chance would be those already provided with a magnesium salt as a byproduct of some other chemical process. In his recent report on magnesium, Mr. Symington recommends that six Government-owned magnesium plants be maintained on a standby basis, or be permitted to continue restricted production, and that all the others be disposed of by whatever means are available. The six plants considered most desirable are: the two Dow plants in Texas; Diamond Magnesium and Magnesium Reduction, both in Ohio; the Electro-Metallurgical plant, in Washington; the New England Lime Co. plant, in Connecticut.

## Value of Pidgeon Process

Three of these plants make use of the ferrosilicon or Pidgeon process, which has worked so well and been improved so consistently that it is encouraging to hear of plans for its continuance. The distillation of metals under high vacuum seems so fruitful a process that it would be well for the RFC to assist in its development, not with the aim of establishing competition with the Dow process, but merely to pursue a most promising line of attack on metallurgical problems.

## Chromium and Manganese

The Manganese Ore Co. plant, near Las Vegas, Nev., now shut down, is a fine example of a one-purpose plant that will not find a ready market. It was tailor-made to produce manganese oxide nodules by a leaching process, but it never reached capacity, nor were its operating difficulties ever ironed out sufficiently to provide satisfactory cost data. Under these circumstances, the plant could hardly be taken over with any great assurance of competing with imported manganese ores, yet the process used there might some day be extremely useful to the United States. The U. S. Bureau of Mines is attempting to arrange the conversion of this plant to produce electrolytic manganese. Such a procedure will at least cash in on the ore mined, paid for, and stockpiled at the plant; at best, it could provide the country with another dependable source of manganese metal.

The Government's chrome plants present similar problems, in that the chrome concentrates produced have been of inferior grade, unavoidably in some cases. Sales of these plants as chrome producers is therefore not likely, but the RFC, in this case and some others, hopes by spending a little money on research to develop suitable processes whereby these chrome concentrates would be made useful even in a peacetime economy.

## Copper, Lead, Zinc

Plants turning out copper, lead, and zinc will probably not become surplus until after next June. What happens then depends on the prices of the metals, which depends on whether or not people have gone back to work by then. Granted, a settlement of labor disputes, there seems to be reason to believe that demand for these three metals will be good. What prices will prevail will depend on tariff policy as well as demand.

## Iron Ore

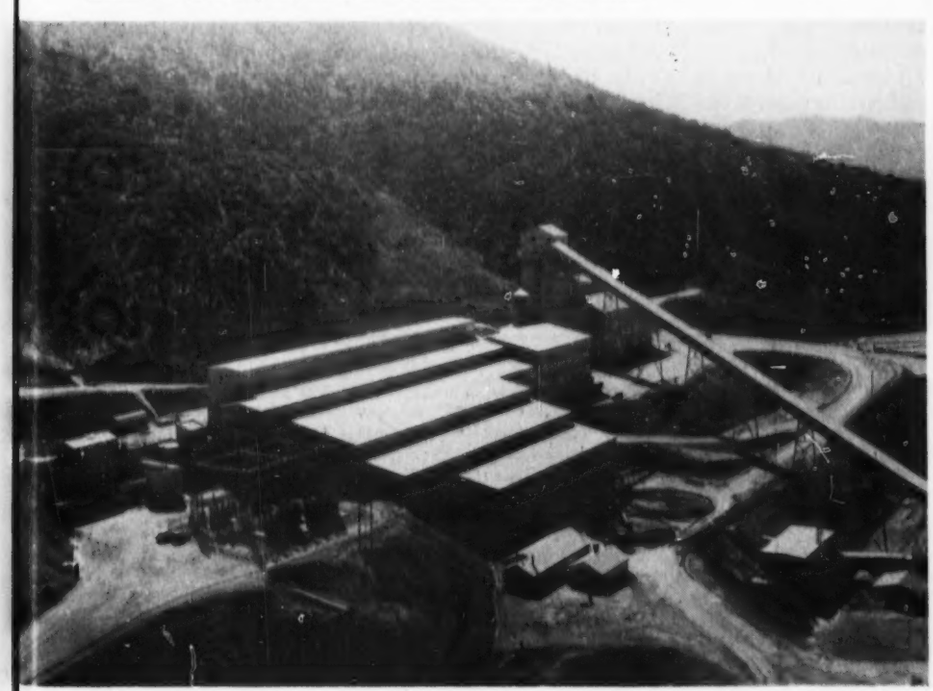
Surplus iron-ore plants occupy a position somewhere between aluminum and copper. Their continuance depends on the future volume of the nation's business; their ownership will be determined somewhat on ideological grounds, though not to the same extent as the aluminum plants.

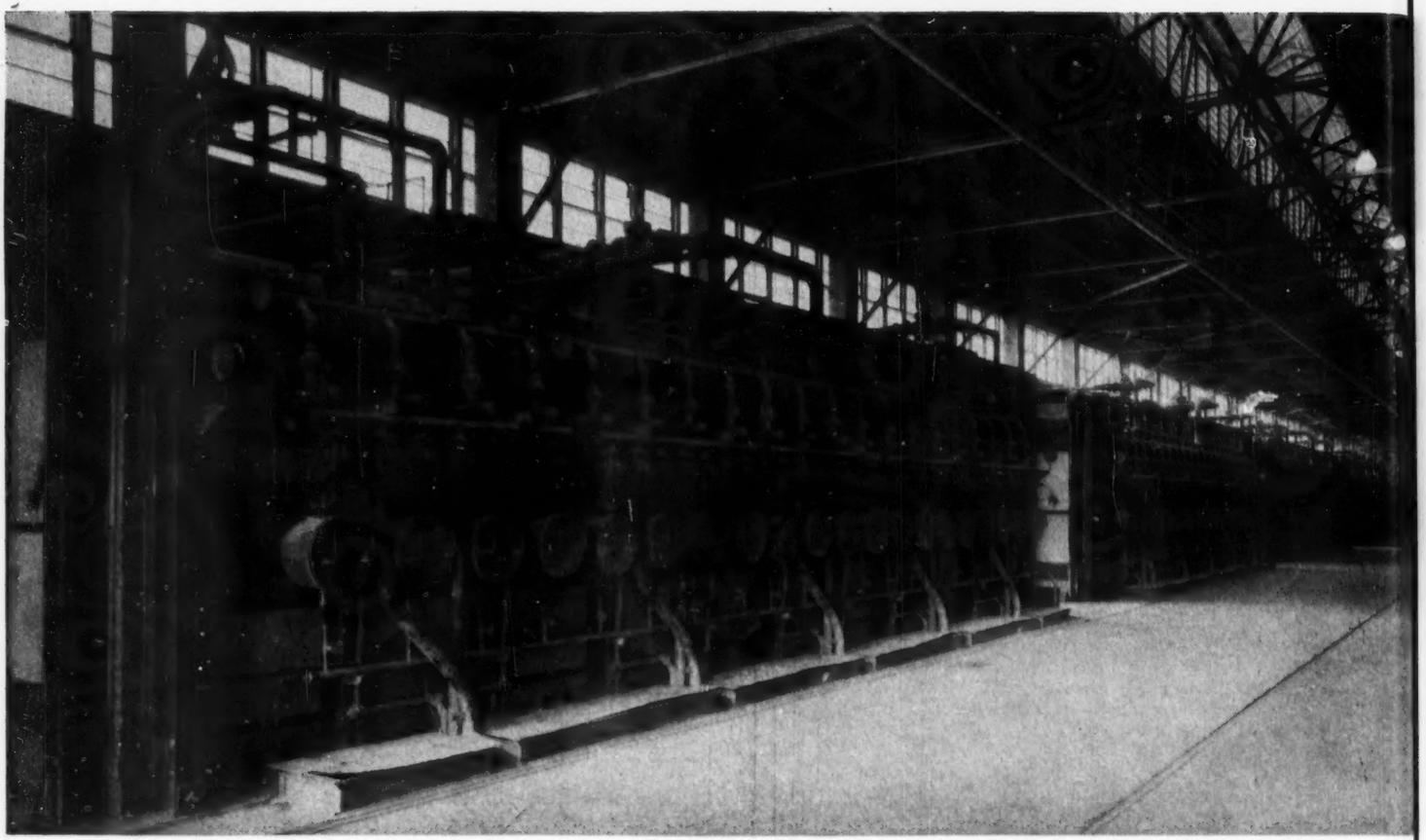
The various sintering plants listed, which are owned by the Government, such as the Jones and Laughlin plant, in New York, and the Republic Steel plant in Alabama, are well designed and well built. With a good demand for steel, these plants should continue operating. Their future looks even brighter in the light of recent predictions of increasing dependence on concentration of low-grade iron ores.

## Miscellaneous Plants

Sale of most of the other Government-owned metallurgical plants depends on special factors in each case. For example, the future of our fine tin smelter in Texas depends on international politics and controls rather than on metallurgical technique or domestic demand. The newborn tantalum industry could be short- or long-lived, depending on the course of research now in progress. Tungsten, according to men best acquainted with the field, has a reasonably bright future because new uses for the metal are constantly being found. Beryllium, lithium, fluorspar, and graphite do not pre-

**GOVERNMENT-OWNED PLANT CAPABLE of concentrating 12,000 tons of copper ore daily is operated under lease by Castle Dome Copper Co., Inc., at Miami, Ariz. Copper, lead, and zinc plants will probably not become surplus until after June 1946.**





**DOLOMITE AND FERROSILICON** are treated under vacuum in these retorts of the magnesium plant at Luckey, Ohio. This is a fine example of successful plant operation. W. Stuart Symington, Surplus Property Administrator, holds that Government plants such as these should be held available for magnesium production in the interest of national security because private plants at present can meet immediate needs.

sent problems too difficult, according to the RFC. The headaches are rather in the large plants built strictly to satisfy the demands of the war machine.

## Note to Mining

Beyond the mild interest of a possible customer who isn't too anxious to buy, it would seem that the mining industry at large has a pretty definite stake in the matter of disposing of those plants the RFC has on its hands. For one thing, there is the obvious effect that poorly handled disposal would have on the whole economy. Markets could be wrecked, distribution systems could be tangled, and established enterprises could be hampered or destroyed by injudicious disposal of surplus plants. The advice and cooperation of mining companies is therefore welcomed. The time to be heard is before, not after, a deal is concluded.

Also, the possibility of government operation of mills and smelters is very real and not too pleasant a prospect. Nationalization of raw materials is not uncommon in the world today. "There are those," to quote a familiar phrase, whose entire working days on the public payroll are aimed directly at this end. Fortunately few, if any, of such men are employed by the RFC. In self-protection, therefore, the mining industry ought to do all it can to insure acquisition of these plants by private enterprise.

It ought to be possible to arrange mutually satisfactory disposal of the sort of equipment placed in these plants. The best and most modern machinery was installed in most of them. Perhaps an aging mill where the short remaining life of the mine precludes purchase of completely new equipment could be rejuvenated profitably by some of this surplus equipment. Certainly such a possibility is worth looking into.

## Preserve Assets

The thought to bear in mind is that here we have all set up, ready to go, millions of dollars' worth of equipment, lacking only manpower and the pressing of a switch to begin turning out metals to make things people could use if markets develop. Certainly in the light of probable need for much of this capacity at some time in the future, it would seem poor policy not to take the long view as to how much of these national assets should be preserved.

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HISTORICAL SUMMARY: ENGINEERING AND MINING JOURNAL was founded in 1866 as the American Journal of Mining, the title being changed in 1869. The following publications have been consolidated with Engineering and Mining Journal: Coal and Iron Record (1875); The Mining Review (1877); The Polytechnic Review (1879); Mining and Metallurgy (1902); The Mining Magazine (1906); Mining and Engineering World (1917); Mining and Scientific Press (1922); Engineering and Mining World (1932). All rights to foregoing titles of consolidated publications are reserved by the publisher. . . . The following have served as editors in chief of Engineering and Mining Journal and its predecessor publications: G. F. Dawson (1866-67); R. W. Raymond (1867-74); R. W. Raymond and R. P. Rothwell (1874-89); R. P. Rothwell (1890-1901); D. T. Day (1901-02); T. A. Rickard (1903-05); W. R. Ingalls (1905-19); J. E. Spurr (1919-27); A. W. Allen (1927-33); H. C. Parmelee (1933-44); Evan Just (1944-—). The Editorial Staff of Engineering and Mining Journal comprises: Evan Just, editor; H. C. Parmelee, editor emeritus; A. H. Hubbell, managing editor; R. H. Ramsey, J. B. Hutti, and A. W. Knoerr, associate editors; H. H. Wanders, market editor; W. N. P. Reed, assistant editor; G. J. Young, consulting editor.

# Multiclone Units Recover Converter Dust Successfully

**LEONARD LARSON,** General Superintendent, Reduction Plant, Nevada Mines Division, Kennecott Copper Corporation, McGill, Nev.

DUST RECOVERY EQUIPMENT installed and operated during the first few years of operation at the McGill smelting plant consisted of enlarged flues and dust chamber, wherein it was anticipated most of the dust values would settle by gravity and be reclaimed from the sides and bottoms of these units for resmelting. The flue and dust recovery system serving the roasting plant in operation at that time comprised two long double flues and an enlarged double dust chamber situated about halfway to the stack. About 75 percent of the flues and dust chambers were equipped with hopper bottoms through which the settled dust was drawn into cars below and subsequently delivered to the reverberatory furnaces. The dust burden of the roaster gases was quite heavy, and even though recovery was relatively poor, reclaiming and handling of the large accumulation of dust was a difficult task. The long flue and dust chamber installation was costly to maintain, and dust losses through the stack were high.

## Roasting Plant Abandoned

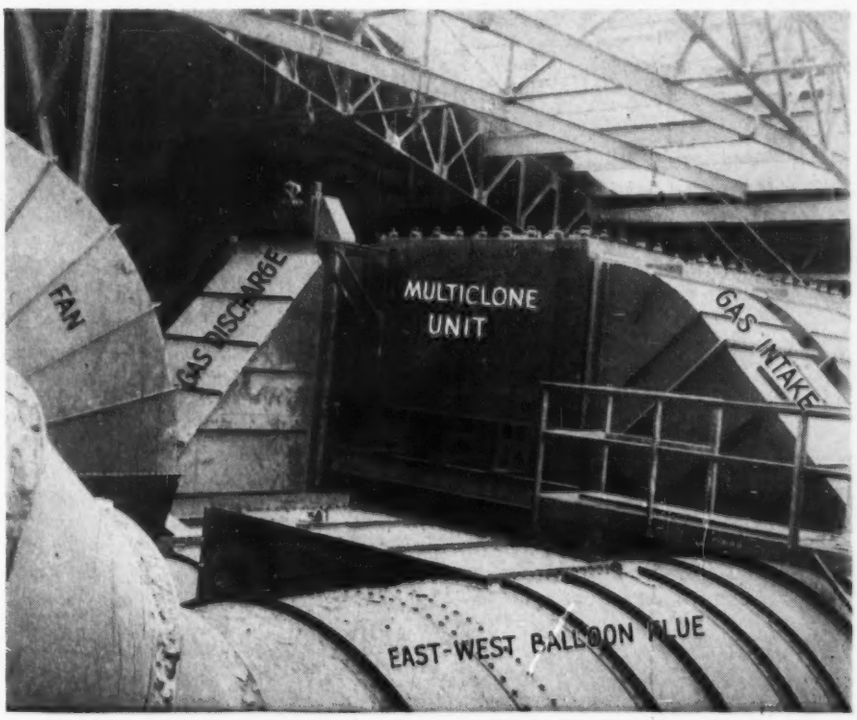
To improve these conditions, it was decided to install a Cottrell precipitation plant located in such a manner as to eliminate about 95 percent of the old flue and chamber system. This plant and a new stack were built in 1929. As it was desirable to reduce the length of the flue system to a minimum, the Cottrell precipitation plant and the new stack were erected close to the roasters. The Cottrell plant recovered dust from roaster gases efficiently until November 1932, at which time the roasting plant was abandoned because of the adoption of the "direct" or "wet" smelting process.

Operators in the copper smelting industry at this time were generally under the impression that wet smelting of copper concentrates in side-charged reverberatory furnaces would not cause sufficient dusting to warrant the installation of dust-recovery plants. However, at McGill it was observed that dusting within the furnace was considerable. Dust accumulated in the combustion chambers, the various baffled passes of the waste-heat boilers, and in the dust chamber. These conditions led to an exhaustive examination of the dust problem. Tests indicated that the dust loss through the stack was sufficient to warrant the installation of a dust-recovery system. As abandonment of the roasting plant made available the Cottrell precipitation plant serving it, consideration was given to moving the latter installation to the site occupied by the dust chamber behind the waste heat boilers serving the reverberatory furnaces as shown on the plant layout.

The first gases from the reverberatory furnace were treated during October 1935. Operating efficiency subsequently obtained fully warranted its installation. A feature in connection with this installation, which was somewhat new at the McGill smelter, was the daily delivery via screw and belt conveyors of accumulated dusts from the flues and Cottrell system to the smelting charge, thereby minimizing the amount of secondary metal tied up in the hoppers and flues.

## Experiments Conducted

During the first few years of Cottrell plant operation experiments were conducted to determine the amount of converter gases that could be treated along with the reverberatory gases in the Cottrell units. It was found that under low production conditions, the Cottrell plant had sufficient capacity to treat about 50 percent of the gases from the con-




**FOUR-UNIT MULTICLONE installation recovers converter dust efficiently at McGill.**

verters in addition to the reverberatory furnace gases, with a net increase in over-all dust recovery. Consequently, advantage was taken of the extra Cottrell capacity, and for a few years the Cottrell plant treated a large proportion of converter gases.

As production requirements increased in 1936, the proportion of converter gases treated in the Cottrell plant gradually decreased. Finally, under high production conditions it was found that diversion of even a small fraction of converter gases through the Cottrell plant so seriously interfered with furnace draft that the desired smelting rate could not be maintained. This led to the study of whether a separate dust-treatment plant for converter gases was warranted. Comprehensive test work pointed toward installation of a separate dust-treatment plant. As a consequence a thorough investigation was made to determine what type of dust-recovery system should be installed for handling converter gases exclusively. Tests demonstrated that a Multiclone dust-collecting system of proper design would give satisfactory results. Selection fell on a Multiclone installation consisting of four units, each containing 45 16-in. tubes. The plant was completed and placed in operation in December 1942.

The study in connection with the Multiclone installation covered the five locations indicated on the plant layout. Tests were made to determine Multiclone efficiency at each location. After careful consideration of gas temperatures, draft, power requirements, and other pertinent factors, it was decided to erect the Multiclone plant at location No. 2. This location, being inside of the reverberatory building, offered a housing already in place, a convenient method of flue-dust disposal, and dust-recovery efficiency equal to any other location.

The Western Precipitation Corporation Multiclone plant is installed alongside of the east-west steel balloon flue about halfway between the converters and the stack. Converter gases are drawn through the Multiclone units by a Buffalo Forge Co. fan, with a rated capacity of 273,000 c.f.m. at 600 deg. F., and driven at a speed of 570 r.p.m. by a 150-h.p. motor. The fan is equipped with water-cooled bearings, and motive power is transmitted by means of a V-belt drive, the motor pulley being supported by an outboard bearing. The gases leaving the fan enter the flue at station "a" in the plant layout, and pass through about 460 ft. of brick flue to the converter stack.

**Typical Multiclone Operating Data**

| Gas Passing Through Units | | Approximate Analysis of Gas Entering Multiclones | | |
|---|---|---|---|---|
| Average c.f.m. | Average Temperature | $\%O_2$ | $\%SO_2$ | $\%SO_3$ |
| 190,000 | 525 deg. F. | 16.8 | 1.6 | Trace |

**Average Temperatures of Gas and Average Drafts In Converter Flue System**

| Location | Station No. Shown on Plant Layout | Temperature, Deg. F. | Draft Inches Water |
|---|---|---|---|
| West End E-W Balloon Flue | a | 600 | 0.7 |
| Entrance to Multiclones | b | 545 | 0.7 |
| Exits of Multiclones | c | 510 | 4.0 |
| Entrance to Fan | | | |
| Exit of Fan | d | 495 | 1.4 |
| Base of Converter Stack | e | 395 | 1.5 |

**Typical Dust Recovered in Multiclones**

| Mesh | Screen Analysis % Wt. | Screen Analysis % Cum. Wt. | Chemical Analysis Oz. Au/Ton | Chemical Analysis Oz. Ag/Ton |
|---|---|---|---|---|
| + 35 | Trace | Trace | 0.16 | 1.08 |
| + 48 | 0.1 | 0.1 | ... | ... |
| + 65 | 0.3 | 0.4 | % Cu | 22.8 |
| + 100 | 2.5 | 2.9 | $\%SiO_2$ | 42.5 |
| + 150 | 5.8 | 8.7 | % Fe | 6.0 |
| + 200 | 12.1 | 20.8 | % CaO | 1.4 |
| —200 | 79.2 | 79.2 | $\%Al_2O_3$ | 5.7 |
| | | | % S | 6.0 |
| | | | % Pb | 0.1 |
| | | | % Zn | 0.1 |

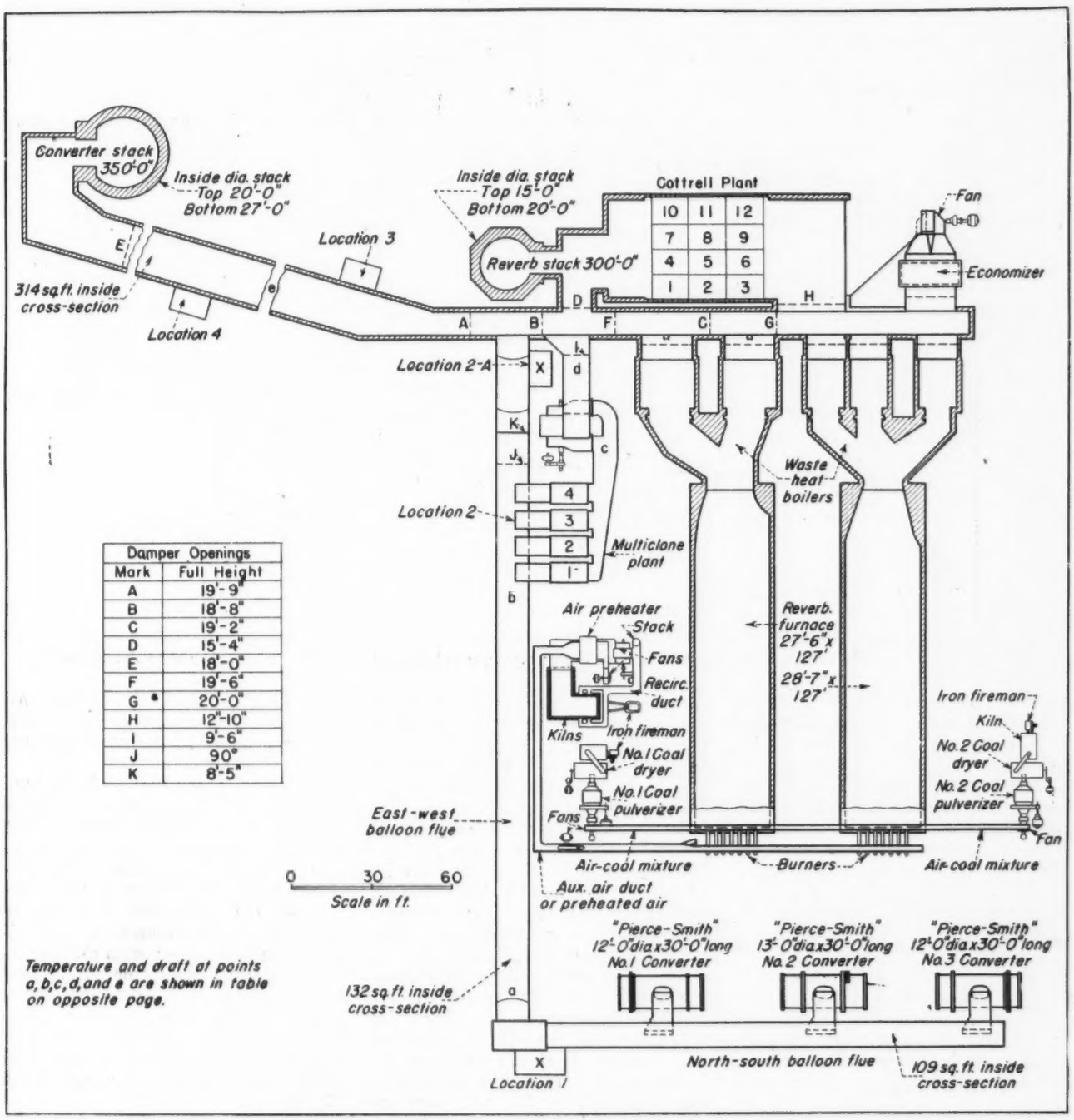
**Typical Dust Recovered in Balloon Flues Before Entering Multiclone Units**

| | Chemical Analyses N-S Steel Flue | Chemical Analyses E-W Steel Flue | | Chemical Analyses N-S Steel Flue | Chemical Analyses E-W Steel Flue |
|---|---|---|---|---|---|
| Oz. Au/Ton | 0.43 | 0.36 | % CaO | 0.1 | 0.1 |
| Oz. Ag/Ton | 2.07 | 1.82 | $\%Al_2O_3$ | 1.2 | 1.6 |
| % Cu | 61.38 | 56.04 | % S | 15.6 | 13.9 |
| $\%SiO_2$ | 6.7 | 11.5 | % Pb | 0.1 | 0.1 |
| % Fe | 8.0 | 7.7 | % Zn | 0.1 | 0.1 |

## Extra Damper Needed

Damper J, which is of the butterfly type, was installed in the balloon flue to divert the gases to the Multiclone plant. After several months of operation it was found that leakage past this damper was allowing dust to bypass the Multiclone plant, thus causing high stack losses. The difficulty was overcome by installing the extra damper K. This damper is of the vertical slide type. It is provided with cams, which force the damper bulkhead tightly against the damper frame seat, thus obviating any leakage. Thereafter no loss of dust into the brick flue was experienced.

With the temperature of the gases passing through the Multiclone fan having a marked effect on the load imposed on the fan motor, it was evident that the whole flue system should be carefully sealed to minimize leakage, and that the entire Multiclone plant, including all connections and the fan housing, should be properly insulated. These precautions were all taken before the plan was placed in operation. Insulation on the Multiclone units, fan, and connections consisted of reinforced rockwool blanket 4-in. thick with Eagle 66 material used to smooth the surface and cover the seams. A trial run of the plant before the insulation was provided showed a temperature drop of 130 deg. F. in the gases passing through the system. The temperature drop after insulation was only 50 deg. F.,




| Damper Openings | |
|---|---|
| Mark | Full Height |
| A | 19'-9" |
| B | 18'-8" |
| C | 19'-2" |
| D | 15'-4" |
| E | 18'-0" |
| F | 19'-6" |
| G | 20'-0" |
| H | 12'-10" |
| I | 9'-6" |
| J | 90° |
| K | 8'-5" |

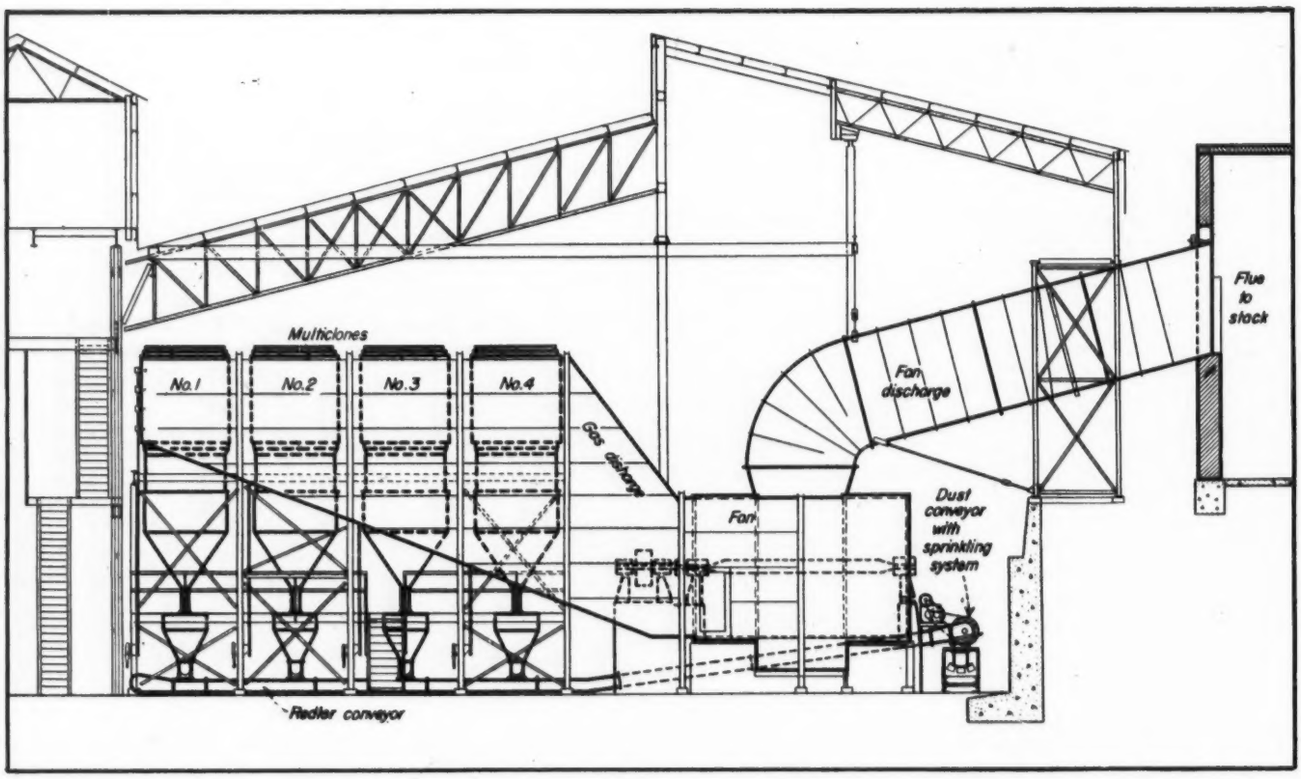
**FINAL MULTICLONE POSITION** was selected after five tests with pilot unit had been conducted at points indicated above.

and this is about the average temperature loss under two-converter operating conditions.

The Multiclone plant consists of four units, and though only three are required in normal three-converter operations, certain plant conditions may call for the use of all four. When the converter plant is operating on a two-converter basis, usually only two Multiclone units are required. Under conditions where more converter draft is needed, the third unit may be required for two-converter operation. One converter operation calls for the use of one Multiclone unit, the remaining two converters being properly dampered or cut off from the balloon flue system.

In order to have ample capacity to handle the converter gases under the maximum conditions mentioned, a fan rated at 273,000 cfm. at 600 deg. F. was installed. Under normal three-converter operating conditions the 150-hp. motor on the fan handles the load satisfactorily. However, if two converters should simultaneously be out of the stack for more than 15 minutes, the motor would become overloaded, and it would be necessary to damper off at least one converter or cut one Multiclone unit. In general, for normal three-converter operating conditions, slightly more than the rated capacity of the motor is required. Under normal two-converter operation the power requirements average about 140 hp.

The Multiclone plant was originally installed with automatic damper




**DAILY REMOVAL of accumulated converter dust through Redler conveyor at bottom of hopper minimizes tie-up of secondary metal.**

control. This feature is not used currently because manual operation is entirely satisfactory. Manually controlled louvre-type dampers at the exit of each Multiclone unit were set to give the required draft, and they remain in the position as long as no major change is made in operating conditions. Multiclone units are cut in or out of service by these louvre-type dampers. The draft is raised or lowered by means of the manually controlled part of the automatic damper-control system. A butterfly-type of damper is available at the entrance of each Multiclone unit. This damper is normally wide open and is closed only when the unit is out of service.

## Dust Removed Daily

Dust recovered by the Multiclone installation is delivered by screw conveyors from hoppers below the Multiclone units to a Redler conveyor, which in turn discharges onto a 24-in. horizontal belt conveyor. This belt also receives the dust removed by screw conveyor each day from the east-west steel balloon flue. The discharge point of each conveyor is covered by a housing, which is vented to the flue system to eliminate dusty conditions. The first 30 ft. of the belt is equipped with a series of rubber scrapers placed at an angle of about 26 deg. along the belt. A spray system is installed above this section of the belt, and sufficient water is sprayed onto the dust as it is being conveyed to give a product containing about 6 percent moisture. The angular scrapers turn the dust and water mixture over from one side to the other, thereby mixing it thoroughly. This mixing system is effective and requires practically no maintenance. The combined dust is delivered to the belt system, which daily conveys concentrates to the bins above the reverberatory furnaces. The dusts are thus mixed thoroughly with concentrates before being charged into the furnace. Dust from the reverberatory flues and the Cottrell plant are also delivered daily to the concentrate conveyor belt.

Multiclone metal recovery efficiencies are checked periodically by means of dust-loss tests. These are made at the exit of the fan and in the flue near the converter stack, or at stations "d" and "e." To facilitate plant operation and control, thermocouples of recording pyrometers are located at the discharge end of the fan and at the base of the converter stack, as well as at the west end of the east-west balloon flue. Instruments are installed to record drafts in the balloon flue at the entrance of the Multiclone plant, and at a point near the converter stack. All recording instruments are in a central gage room in the reverberatory furnace building.

There are sufficient Multiclone units in the installation to assure that it is possible to take a unit out of service at any time for inspection without interfering with converter draft or Multiclone plant recovery. Once a month each unit is shut down for inspection, and all tubes are cleaned out with air spears. This monthly inspection and cleanout assures efficient operation of the units. Under two-converter operating conditions the dust recovery has averaged about 50 percent and copper recovery has averaged about 92 percent.

## Plant Proves Efficient

The Multiclone plant has been in practically continuous operation since December, 1942, treating gases from one converter to three converters. It has operated efficiently and economically during the entire period, and save for a few minor changes, maintenance on the plant has been negligible. No operators are required to run the plant, and dust is removed from the Multiclone hoppers by the same crew used for dust removal from flues before the plant was installed.

# Bearing Wear Is Eliminated By Shunting Shaft Currents

**D. B. HOOVER,** Electrical Design Engineer, Westinghouse Electric Corporation, East Pittsburgh, Pa.

SHAFT CURRENTS in industrial motors and generators may cause excessive bearing wear and resultant bearing failure. Usually these currents must cross the bearing oil film and flow from the shaft into the bearing shell. This action pits the bearing surface and often the shaft, causing bearing wear and frequently bearing wiping. The rate of bearing wear may be rapid, causing bearing failure in a matter of days, or it may be of a slower nature, causing bearing failure after a long period of operation. Wear is accelerated if the current is large and the loading high.

## Currents Pit Bearings

The surface of a bearing which has had bearing currents is covered with fine pit marks (Fig. 1). These pits are often found in bands around the bearing surface, and if the current is very severe the shaft itself will have pit marks.

A simple method of determining the presence of possible bearing currents is to attach a short, heavy cable to the bearing bracket or bearing pedestal of the machine, and then touch the other end of the cable to the rotating shaft as illustrated in Fig. 2. Persistent electrical sparks between the shaft and the cable end indicate that bearing currents are possible. This test in itself will not indicate all bearing currents of sufficient magnitude to damage the bearing. Nevertheless, if the bearing surface has a pitted appearance, and if sparks are present between the shaft and cable, it is nearly certain that damaging currents exist.

Bearing currents may be either direct or alternating, depending on their cause. Magnetic dissymmetry of a machine will cause an a.c. voltage to be generated in the shaft, which will tend to circulate current through the shaft, cross the bearing oil film, through the base, and thence back through the other bearing as shown in Fig. 3. Even in a perfectly designed machine, manufacturing variations may introduce slight magnetic dissymmetry in a machine.

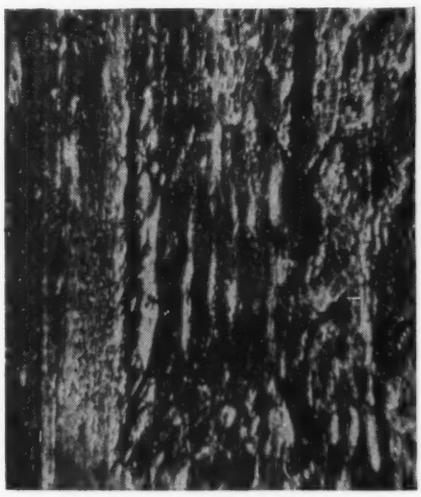


**Fig. 1 This bearing surface has been pitted by shaft currents. Magnification 54 times.**

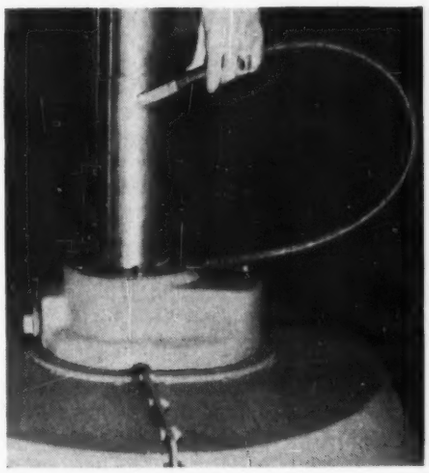


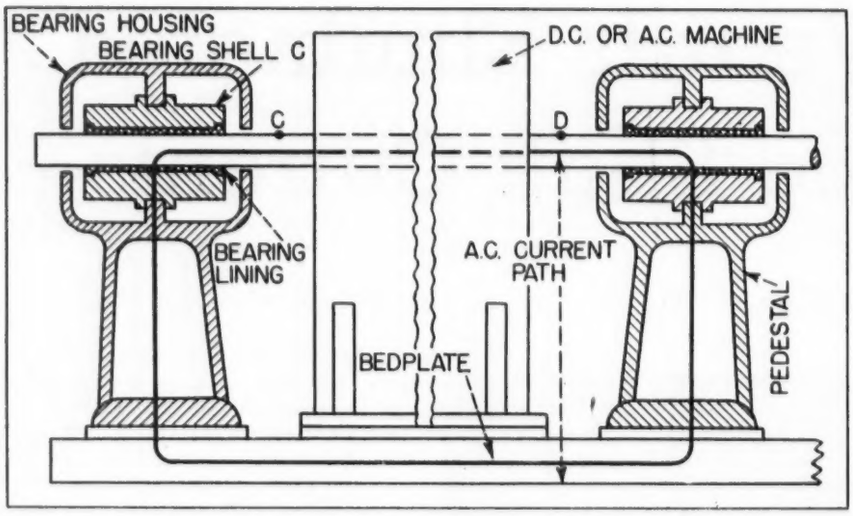
**Fig. 2 Bearing currents can be detected by holding a cable, with one end fastened to the bearing housing, against the shaft of a rotating machine. Sparks at contact indicate possibility of bearing currents.**

Magnetization of the shaft may produce d.c. bearing currents. The method of connecting the series and commutating fields of a d.c. machine may produce a magnetizing effect on the shaft of the machine if the load current is allowed to make an uncompensated turn around the shaft. This action is exactly the same as an elementary iron core electromagnet which has turns of wire about its core. It is possible by proper connection to reduce the shaft magnetization to a small value. This magnetizing effect will cause magnetic flux to pass along the shaft, across the bearing oil film, through the base, and thence back through the other bearing. The flux set up by the magnetizing force generates a homopolar d.c. voltage in the shaft along the bearing, which, if sufficiently large, causes direct currents to circulate from the shaft through the bearing and back to the shaft. In other words, this bearing current circulates locally within the bearing, as shown in Fig. 4, and does not flow through the entire length of shaft.

Alternating bearing currents may best be eliminated by insulating one bearing, including holding down bolts, dowels, oil piping, and grounded connections. This insulation, if kept in good condition, will break the path of the current.

Direct currents in bearings may best be eliminated by reducing the magnetizing force around the shaft. It is recommended that the manufacturer of the machine be contacted under the conditions mentioned. Bearing insulation will reduce the flux and thereby reduce the internal circulating bearing currents.

Both a.c. and d.c. bearing currents may be reduced by shunting most of the bearing current out of the bearing. This may be accomplished by adding brush holders (with brushes that ride on the shaft) to the bearing pedestal or bracket in a manner similar to that indicated in Fig. 5. Brushes for this application must have very low resistance, as the resistance of the brushes must be much less than the resistance of the bearing oil film. Metal graphite brushes with high copper content are suit-



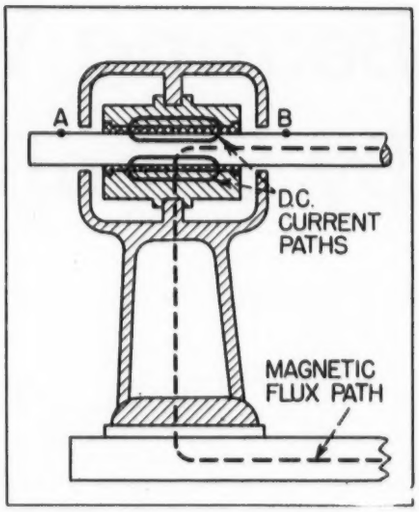




**Fig. 3 LEFT. Path of a.c. shaft currents produced by magnetic dissymmetry in a machine. Measure volts at points "C" and "D" to detect a.c. currents. Fig. 4 RIGHT. Path of d.c. shaft currents produced by magnetization of shaft. Measure d.c. millivolts at "A" and "B."**

able for this use. This method will usually reduce bearing currents to a safe value on all types of bearing currents. However, the brushes require a certain amount of maintenance and may be objectionable from this point of view.

The presence of some bearing current may not damage the bearings of a machine. The magnitude of the damage is dependent on bearing current, bearing loading, condition of the oil, and condition of the bearing and journal surfaces.

The voltage measured across the shaft on each side of a bearing is an indication of possible d.c. bearing currents. Usually a voltage of 150 millivolts (measured with a d.c. millivolt meter) will not circulate currents of sufficient magnitude to cause damage in a sleeve bearing. If an a.c. voltage is present across the shaft of a machine (from a point on each side of the rotor on the shaft inside of each bearing pedestal or bracket), it is evidence that some a.c. shaft current may be present. However, it is not possible to take reliable electrical readings of the magnitude of bearing currents and voltages with ordinary instruments. An oscillograph will give much better results when used with the proper shunts and elements. Even if reliable readings are taken, they are difficult to interpret in terms of possible damage, because of the variable factors entering into bearing damage.

Proper maintenance of oil and bearing conditions tends to eliminate wear caused by bearing currents for the reason that a good, clean oil film increases the resistance to current flow. This oil film acts as an insulator except for very minute projections on the bearing surface which may press through the oil film. Some machines are originally built with bearings that are insulated. Any insulated bearings should be checked periodically to make sure that they remain insulated. Often mechanical parts which are close to the bearing will be moved and short across the bearing insulation, causing shaft current to flow.

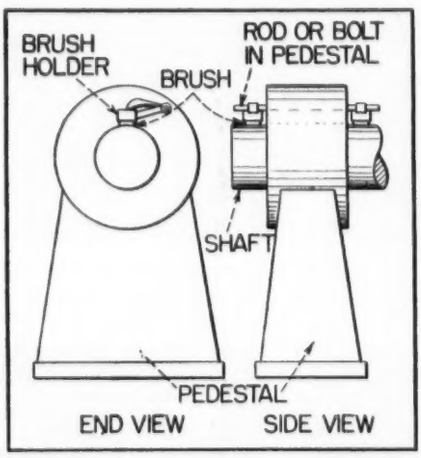



**Fig. 5 A.c. or d.c. bearing currents may be reduced to harmless values by shunting them out of the shaft with brushes attached to the bearing housing and riding on the shaft.**

It is wise to consult the manufacturer of the machine on the development of serious shaft currents because he is best qualified to make suitable recommendations.

Roller or ball bearings are more likely to have bearing currents and abnormal heating than sleeve-type bearings, because the contact between the bearing and the shaft is extremely good. High-speed rollers or balls in the bearing will cut any flux passing from the shaft to the bearing at a high rate, thus inducing bearing currents within the balls or rollers and causing overheating.

Bearing currents may be caused occasionally by an external source. Widely spaced buses carrying large direct currents can set up a strong magnetic field, which may cut the shaft and thereby induce a voltage in the shaft. This in turn can generate bearing currents. Closely spaced transposed buses will cure this condition. However, it may be necessary to demagnetize the shaft and surrounding structures when the new, transposed, closely spaced bus is installed to eliminate the effects of old residual magnetism. Shunting brushes will help prevent damaging currents in the bearings.

A grounded coil on the rotor of a machine may cause current to flow through a bearing. Periodic insulation resistance readings on each machine would detect this condition.

Ground currents flowing through the foundation of the building may flow up through the parallel current path formed by the bearings and shaft of the machine. A low-resistance foundation or grounding cables would help remedy this type of trouble.

In general, bearing currents may be generated by many sources. The best procedure to follow is one of elimination. Eliminate each possible source as the investigation proceeds. First, make a complete bearing inspection and then check the machine, using the sparking test. Investigate the possibility of a.c. or d.c. bearing currents generated by the machines themselves and eliminate or remedy this if required.

# Moroccan Mine Develops Unusual Classifier Design

**E. J. BRETON**
405 E. Main St.
Bartow, Fla.

BECAUSE OF A LACK of spares and new machinery during the war, the staff at Mine de Gundafa, a small lead-zinc mine in southwestern Morocco, had to design and construct some of its own equipment to keep going. Scrap materials were drawn upon for the most part. Among the most interesting of the units so constructed or adapted was a classifier of unusual design shown herewith.

The Mine de Gundafa is about 180 km. north of Casablanca over paved roads. The region is mountainous, somewhat similar to the San Juan, Colo., or Silver City, N. M., areas. Deep gulches cut into the beds of sandstone and limestone, which cover most of the area, and snow stays on the 10,000-ft. mountain peaks through most of the year. Some streams run from these snow peaks into the adjacent desert, where they disappear. Water supply varies with the seasons, and during the summer, flow in the creek near which the mill is located becomes barely sufficient for operations.

The ore occurs in a faulted zone in limestone about 9 to 18 ft. wide, which is filled with quartz and calcite containing lenses of galena and sphalerite. The oreshoot has been traced for about 300 ft. on the surface and has been worked to a depth of about 500 ft.

Tunnels on three levels have been driven to the orebody, and from these levels raises are driven at regular intervals in the ore zone. From these raises, prospect drifts are advanced in search of ore lenses. These lenses usually extend from wall to wall of the zone and are 30 to 60 ft. in length and depth.

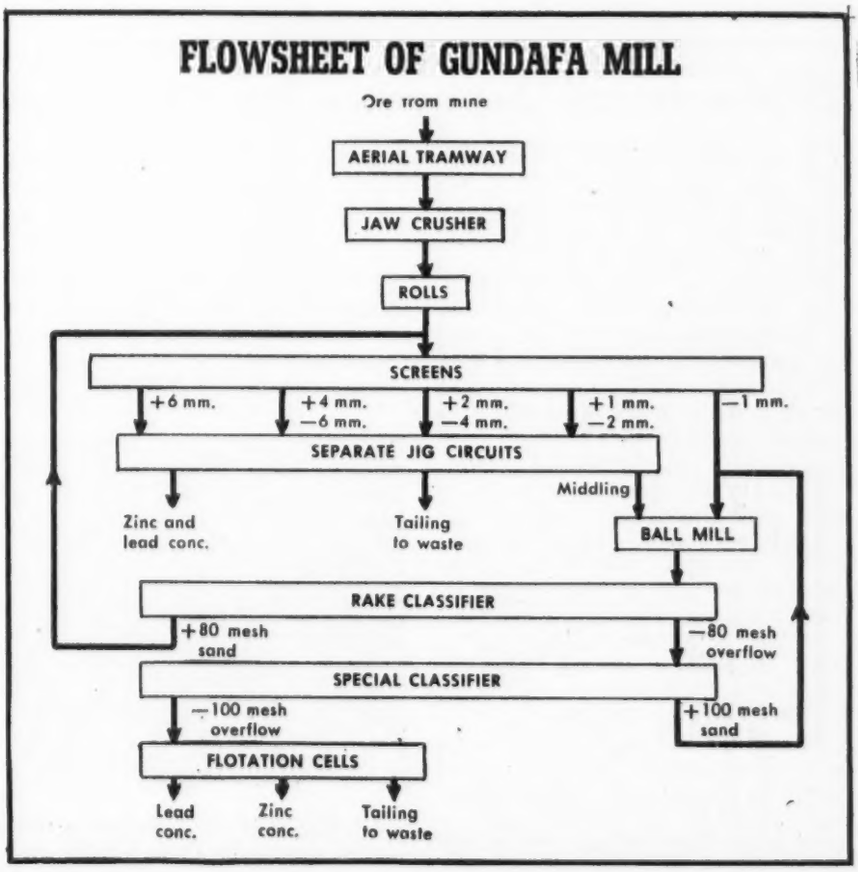
Ore is mined in a series of horizontal slices progressing upward in the lens, and broken rock is sorted in the stopes. About 50 percent of the rock is left in the stopes as backfilling, supplemented by barren rock blasted down as needed. The ore is generally soft, and some of it can be picked down. An aerial tramway carries ore from the mine about 1½ miles to the mill.

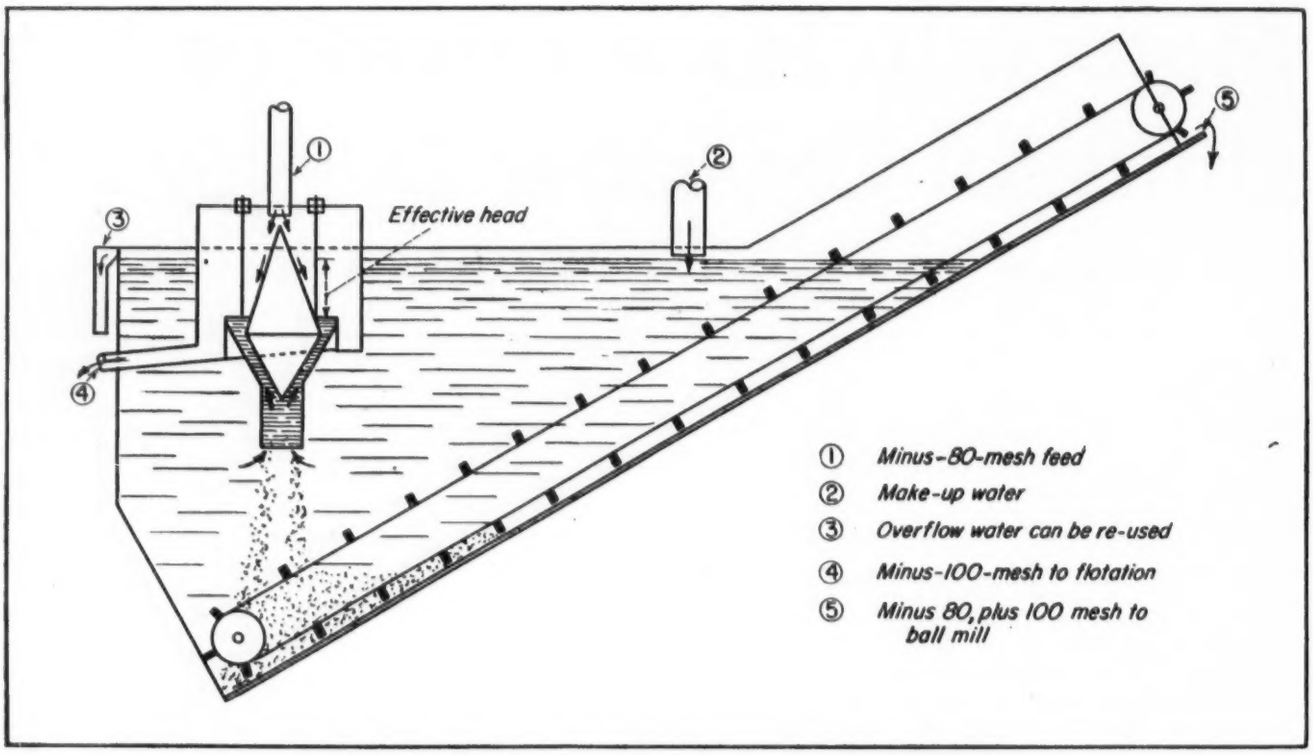
The galena and the sphalerite are intimately mixed, and minus-100-mesh grinding is required to liberate them. The ore is crushed in jaw crusher and rolls, passing thereafter over submerged Ferraris-type screens, which size the crushed ore for jig feed. These screens were built at the property, and economies in wear of screen cloth and water consumption are claimed for them.

Plus-1-mm. screen product is jigged in four sizes to make concentrates, tailing, and middlings. The jig tailing goes to waste, and middlings join minus-1-mm. screen undersize in going to a fine-grinding circuit, which consists of a ball mill, an ordinary rake classifier, and the classifier mentioned previously. The ground ore is floated in deep cell machines. Mill capacity is about 5 tons an hour. Lead concentrate assays about 78 percent Pb and 4 percent Zn; zinc concentrate runs 56 percent Zn and 3 percent Pb. Recovery is about 85 percent.

Ball-mill discharge is separated at 80 mesh in a rake classifier, the overflow of which goes to the special classifier, in which the 100-mesh separation is made. As shown in an accompanying sketch, the classifier is of the hydraulic type, the separation taking place in a sorting column the width of which is varied by raising or lowering the cone distributor. Classifier underflow is returned to the ball mill.

This classifier is said to make an efficient separation at 100 mesh on the minus-80-mesh material fed to it, and operation with respect to ease of adjustment and water consumption is said to be satisfactory. If desired, there seems to be no rea-






**UNUSUAL** hydraulic-type classifier was designed to make 100-mesh separation.

son why large capacity units of this type could not be built by putting three or four classifying units 10 to 16 in. in diameter into a large tank.

The Gundafa property is operated by four Europeans (French) and 200 native craftsmen and laborers. The entire plant is powered by diesel-generated electricity, but because of the lack of fuel oil, producer gas generated from charcoal has been used for the engines during the war.

# Concentrator Duplicates Panning Motion

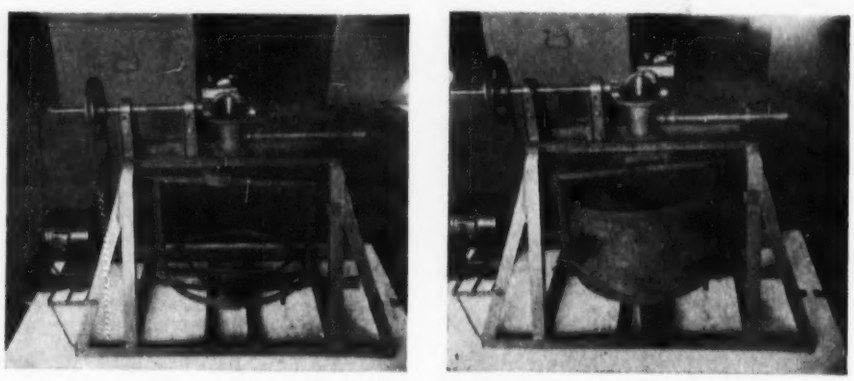
A CLOSE APPROXIMATION of the motion most hand panners use in recovering gold has been successfully duplicated in a relatively large-scale machine invented by A. A. Johnston, 705 Southeast Belmont, Portland, Ore. By an ingenious combination of mechanical motions, Mr. Johnston's concentrator imparts to a nest of pans a gyration plus a dip that has been found effective in gold concentration and amalgamation.

Shown in accompanying photographs, the unit is 24 in. long, 14 in. wide, and 15 in. high. About 1/20 hp. drives the machine. Uppermost in the stack of pans is a screen classifier with three pans below it. All gyrate in unison. Each pan has a central outlet for tailing, and a small depression at the edge in which concentrate collects. Operation is either batch or continuous.

The frame holding the pans rests on a ball-and-socket joint and is connected at the top to a variable-diameter eccentric rotated through a bevel gear. The vertical axis of the stack of pans may be tipped by moving the ball-and-socket joint in the horizontal plane. Gyration of the pans about this tilted axis produces what the inventor calls the "dip."

Because the pan frame is free to rotate as well as gyrate, a snubber bar has been provided to catch the frame as it gyrates and prevent rotation. Apparently this snubber bar has an effect similar to the bump given a pan on each gyration by the heel of the panner's hand if he so desires.

Competent observers report that this gyro concentrator effectively recovers fine gold from Columbia River sand containing much magnetite, and that it proved useful in cleaning up dredge black sand concentrates.



**GOLD RECOVERY** by a mechanical motion simulating hand panning is claimed for this gyratory concentrator. Frame is at left; assembled machine with nest of three pans is at right.

# How Hudson Bay Runs Its Mine Warehouse

**P. G. BISHOP**, Hudson Bay Mining & Smelting Co., Flin Flon, Man.

**III. The stock books are vital to efficient storekeeping. Properly kept, they present many advantages in meeting the purposes for which they are set up and which justify the attention they receive in the Flin Flon warehouse. Parts I and II of this article appeared in the October and November issues respectively. Part IV will be published soon.**

AFTER A SHIPMENT is entered to the cost record on which freight and invoice are together, such papers are handed to the stock-book clerk for debit entry to the stock book. The stock-book clerk divides up the freight shown, according to the weight, or in some cases according to invoice cost of items, whichever appears the more logical, and arrives at a total debit for each different item. The totals for the various items are pencilled in on the face of the duplicate invoice, care being used to see that the total of items equals the sum of the invoice and freight. He now enters the debit to the stock-book pages and changes the price on the stock book by averaging with any balance shown on hand, prior to posting the debit.

Perhaps the clearest way to explain stock-book entries is shown by the stock record reproduced in Illustration 14 and in the following. The stock-book page used is 11x12-in. and will hold 160 debit and 160 credit entries. Note that numbers at head of columns are explanatory only.

Column 1 shows purchase requisition number, date, and quantity.

Column 2 shows date and purchase order number on which material is received. It is best to use the actual date on which the train arrived on receiving slips, cost-record page, and stock-book entries. The quantity received in pieces, gallons, weight, etc., to line up with unit as shown is also entered.

Column 3 shows the date and issue requisition number covering issue from warehouse.

Column 4 gives the balance quantity on hand.

When an entry is made in column 2, the requisition reference made in pencil is erased in column 1 if all has been received. If it is only partly received, this quantity figure is crossed off and the balance still to come is written below.

## Balancing Important

At every debit entry and also at every fifth line, the total of debits—column 2 and credits—column 3, is pencilled in. The quantity of the last balance—column 4—plus issues—column 3—must equal the total of debits in column 2. It is important to do this balancing. At the foot of the page, the balance—column 4—is carried forward to columns 2 and 4 to start off again. If issues are in excess of balance, which would result in a red balance figure, an investigation should be made. If the overdraft is caused by issue of material which has reached the stock shelf but for which the corresponding debit entry has not yet been made in the stock book, it is all right. Otherwise, there is something wrong. Overdrafts should be watched just as in a bank.

At the end of a year, or any desired period, the stock book may be ruled off for inventory purposes. For clarity, this ruling may be done with colored pencils and the colors changed each inventory. The balance figure times the price is the inventory figure (to be amplified later).

The direct-charge stock page, shown in Illustration 15, covers material which does not go into stock but directly to the job. Such sheets are generally placed at front of proper material class in the stock book. In case of large construction of a particular unit, it is best to use one or more sheets headed with a description of the job. Miscellaneous direct-charge sheets for a number of small purchases may be placed at the head of the proper classes. These show the cost and account charges, the same as on Illustration 15.

Illustration 16, showing the shop-order stock page, indicates the use of this sheet rather fully. The price

**14.** Stock Record

Maximum _____ STOCK RECORD Class H

Minimum _____ Stock No. _____

Location W5A Article: BOLTS ½"x4" - Machine Unit C

Cost Price 2.78

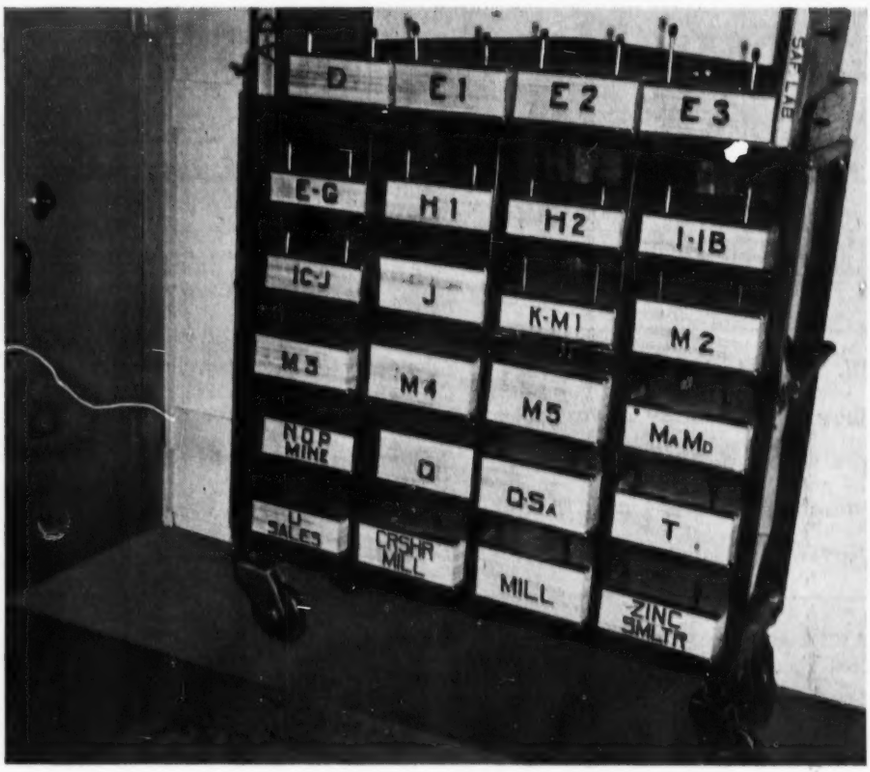
| 1 ORDERED | 2 RECEIVED | | | 3 ISSUED | | | 4 BALANCE |
|---|---|---|---|---|---|---|---|
| Reqn. No. & Date | Date | Order | Quantity | Date | Reqn. No. | Quantity | |
| | 1944 Brot. Forward | | 386 | 1944 | | | 386 |
| 8/13 34384 1M | | | | 5/24 | 4085 | 4 | |
| | | | | 6/14 | 2053 | 4 | |
| | | | | 6/15 | 2353 | 50 | |
| | | | | 6/21 | 3281 | 8 | 320 |
| | 7/10 Order | 59261 | 300 | | | | 620 |

for issues is determined by dividing quantity on hand into total balance of money, but some jockeying and judgment are needed to keep the charge price reasonable, as for instance not to consider partial debits against a later shop order than the one from which the item is issued. Thin copies of all shop orders are inserted on top of stock-book pages to act as a requisition reference and are removed as each order is completed.

The stock-book page shown in Illustration 17 is used for purchases from local firms and a separate sheet maintained for each supplier, so that such accounts are readily checked if need be.

Pages to handle miscellaneous inward and outward freight and express for items not covered by purchase orders are shown in Illustrations 18 and 19. For convenience, stock pages as per Illustrations 18 and 19 are run through Class Z.

Illustration 20 merely shows an index stock page placed at the head of the stock pages covering parts for a 40-ton locomotive. The colors indicated are on the tags marking the goods and the subdivisions are in line with the makers' catalog divisions and also with the arrangement of the stock in the warehouse.




**STOCK BOOKS** in Hudson Bay company's warehouse are kept in this cabinet, which is mounted on wheels so that it may be moved about as desired.

**15.** Direct Charge Stock Page

Maximum _____ Minimum _____ Location _____ Article: COMPRESSOR - Sullivan 40# Class WM-31, 18 and 18x14 L.H. Single Stage - Angle D-186

STOCK RECORD

Class M
Stock No. _____
Unit D/C
Cost Price _____

with: 250-hp, 300 rpm, 2200v, 3 ph. 60 cycle
1.0 Power Factor 50°C. engine type
synchronous motor w/ split rotor, Ser. 291625

1 Class CR-7065 Full Voltage Magnetic Controller
1 5 kw Motor Generator Exciter 550v, 3 ph. 60 cycle
125 volt, DC, Gen. #83915-B Motor #306864
1 Class CE-7006 automatic full voltage starter

| 1940 | | | | 1940 | | | |
|---|---|---|---|---|---|---|---|
| 11/27 | 36911 | 11,751.30 | Compressor,etc. | 11/27 | 4225 | 11,751.30 | a/c 960-103 |
| 11/27 | 36911 | 62.41 | Express-Cyl.Head | 11/27 | 4226 | 62.41 | a/c 960-103 |

**16.** Shop Order Stock Page

Maximum _____ Minimum _____ Location W32A Article: #23-13-T NUTS - Column Arm Cap For 3½ S.S. Columns (Made in Shop)

STOCK RECORD

Class D
Stock No. _____
Unit Each
Cost Price _____

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Jan. 1/44 | 211 | 74.47 | | | | | 211/74.47 |
| | | | 1/21 | 2541 | 25 | 8.75 | |
| | | | 1/26 | 3517 | 50 | 17.50 | |
| | | | 2/7 | 877 | 20 | 7.00 | |
| | | | 2/15 | 2297 | 10 | 3.50 | |
| | | | | | | | 106/37.72 |

After each debit invoice has been entered to the stock books, a memo showing the amount to each class and the number of the cost record page is made. The totals of these memos are called off against corresponding entries on the cost record, and each cost record entry is dated with a dating stamp in the right-hand column with the date on which the comparison is made. Therefore, at the end of a month, if any completed items in the cost record are not dated, it is necessary to locate the receiving papers and post them to stock. The drawing off of memos for stock debits allows the purchase orders and receiving papers to be filed promptly.

The debit memos of posted debit items are totaled several times a month. Also, totals going to each material class are made, the grand totals of each listing being the same. This is done on adding machine tape.

The total debits to each class are summarized as Illustration 23 and the grand total of this summary for one month must equal the net total of the cost record (Illustration 16).

## What the Stock Books Show

The following can be determined by checking through the stock books:

1. How much of an item is on hand.
2. The cost of items.
3. Whether stock is high or low.
4. How much is on order and when ordered.
5. If stock is active or slow-moving or possibly obsolete.
6. Consumption for any period can be quickly determined.
7. The correct description and serial number of important machinery.
8. Clerical errors in entries are often apparent.
9. Location of material in warehouse and material class is shown.
12. The last order number of items purchased and quantity received.
11. Special information noted on sheet about any item.
12. Stock numbers. Regarding "Stock No." shown on the upper right-hand corner of stock sheets: this number is of no great value if employees all speak one language. However, in the case of plants operated by English-speaking officials in, say, a Spanish-speaking country, it is very necessary to mark locations containing items which are identical with a stock number, and this number is placed on each issue requisition in addition to the description.

*The procedure followed in issuing material from the Flin Flon warehouse, and the matters of taking inventory and setting up a filing system, will be discussed in an early issue.*

**Illustration 21.**

```
7367  I    172.59
     IA     81.75
           254.34
```

**Illustration 22.**

```
Class D  550.30
          22.50
          45.60
          55.75
         674.15T
Class E   55.60
          11.40
           3.20
           4.50
           1.21
          77.50
          58.85
          66.40
         278.66T
Class I  172.59
Class IA  81.75
      etc., etc.
```

**17.** Local Purchases — Class Z

Maximum ____ Minimum ____ Location ____ Article: Local Purchases BELL'S HARDWARE — STOCK RECORD — Stock No. ____ Unit Direct — Cost Price ____

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1944 | | | | 1944 | | | |
| 8/7 | F-4738 | .38 | Steel Wool | 8/10 | 1635 | .38 | a/c 8044-8010 |
| 8/7 | F-4738 | 2.50 | Spark Plugs | 8/10 | 1636 | 2.50 | a/c 8046-14-2000 |
| 8/7 | F-4738 | .82 | Mirror | 8/10 | 1637 | .82 | a/c 784-211-3355 |
| 9/9 | F-4762 | .11 | Snare Wire | 9/14 | 2215 | .11 | a/c 980-709-9925 |

**18.** Miscellaneous Freight and Express — Class Z

Maximum ____ Minimum ____ Location ____ Article: Misc. TRANSPORTATION - INWARD — STOCK RECORD — Stock No. ____ Unit Direct — Cost Price ____

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1944 | | | | 1944 | | | |
| 3/20 | 56505 | .78 | Frt.0/7337 C.R.P. | 3/23 | 3419 | .78 | a/c 8122 |
| 3/20 | 56506 | .35 | Frt.0/359 E.M.L. | 3/23 | 3642 | .35 | a/c 8048 |
| 3/29 | X3-176 | 1.10 | Exp. Reports | 3/27 | 4021 | 1.10 | a/c 761-020 |
| 5/26 | X5-54 | .56 | Exp. Ore Samples | 5/29 | 4867 | .56 | a/c 721-030 |

**19.** Miscellaneous Freight and Express — Class Z

Maximum ____ Minimum ____ Location ____ Article: Misc. TRANSPORTATION - OUTWARD — STOCK RECORD — Stock No. ____ Unit Direct — Cost Price ____

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1944 | | | | 1944 | | | |
| 7/20 | B/L 9963 | 2.48 | Cable for Test | 7/27 | 4192 | 2.48 | a/c 100-00-14-270 |
| 7/21 | B/L 9971 | .66 | Reports | 7/24 | 3957 | .66 | a/c 761-020 |
| 7/21 | B/L 9973 | .23 | Water Samples | 7/24 | 3959 | .23 | a/c 700-020 |
| 7/30 | B/L 9982 | 1.75 | Ore Samples | 7/30 | 5293 | 1.75 | a/c 721-030 |

**20.** Index Stock Page — Class ____

Maximum ____ Minimum ____ Location ____ Article: ____ — STOCK RECORD — Stock No. ____ Unit ____ — Cost Price ____

40-TON GENERAL ELECTRIC LOCOMOTIVE

Index:


| | | |
|---|---|---|
| Yellow | Compressors - Governors | 1 |
| Blue | Motors | 2 |
| Red | Contactors | 3 |
| Pink | Controller | 4 |
| Lemon | Resistor | 5 |
| Yellow | Reverser | 6 |
| Green | Mechanical | 7 |


**23.** Recapitulation

MINING COMPANY
RECAPITULATION SHEET

Month of October, 1944 — Receipts

| | A | B | C | D | E | Totals |
|---|---|---|---|---|---|---|
| Oct. 1st | 167.95 | | | 674.15 | 278.66 | 1,375.10 |
| | | | | (Other classes omitted) | | |
| (Other dates omitted which make up total) | | | | | | |
| Totals | 763.41 | 432.19 | 115.32 | 967.12 | 843.21 | 64,609.97 |

# OPERATING IDEAS

## Four Unusual Ways to Mount Slusher Hoists

Four practical and unusual methods of mounting slusher hoists in metal mines are shown in the accompanying illustrations. Figures 1, 2, 3, and 5 show the construction details and assembly of an adjustable type used in the Coeur d'Alene district. Ralph Neyman, mine superintendent of the Hecla Mining Co., designed the assembly, which consists of top and bottom tables connected by a standard 12-in. Victaulic coupling. Simplicity of design and the ease with which the tables may be adjusted are its outstanding advantages. To adjust, the operator loosens the nuts on the long bolts fitted with pipe spacers, turns the hoist to desired position, and locks the nuts.

Other types of mountings are illustrated in photographs submitted by Roger Pierce, of the Ingersoll-Rand Co.

Fig. 4 depicts another turntable type employing a regular cone clamp welded to a steel base plate. The hoist may be turned or removed by loosening the cone-clamp nut.

Fig. 6 shows a light-weight scraper hoist assembly used in the Tri-State district. This rubber-tired portable unit is particularly adaptable to small orebodies and clean-up operations where the larger caterpillar-mounted scrapers cannot be used to equal advantage.

Figs. 7 and 8 illustrate an air-powered hoist mounted on a warehouse truck. The frame is built on the side of the truck so that the hoist can be moved into operating position. The top of the frame leans against a lagging nailed between two posts. This equipment is convenient for square-set stoping.

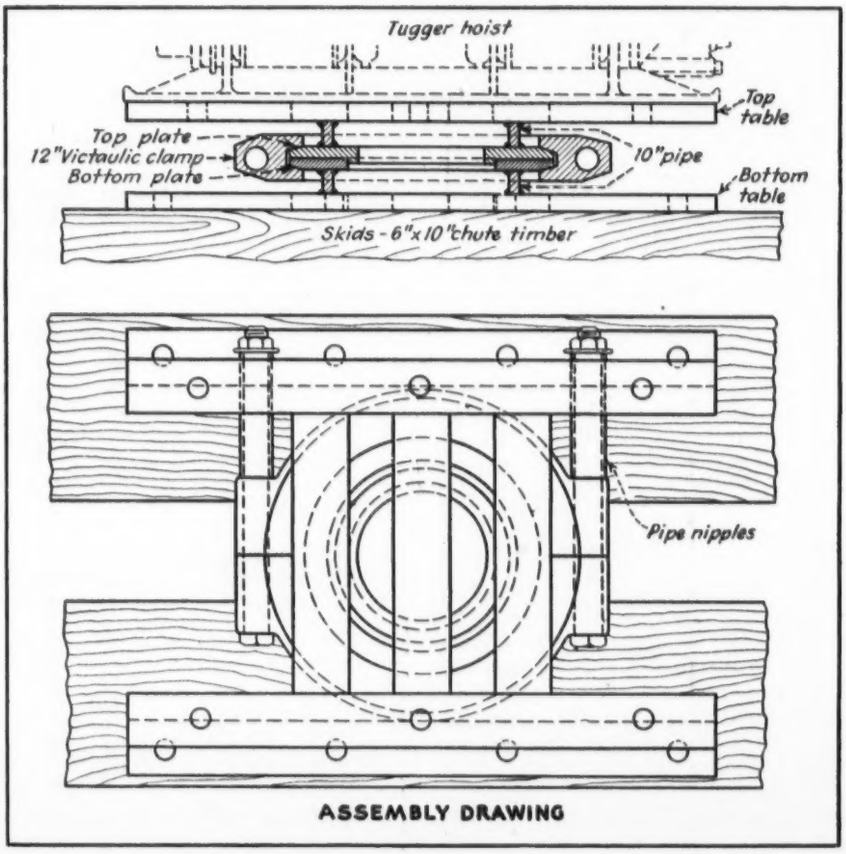
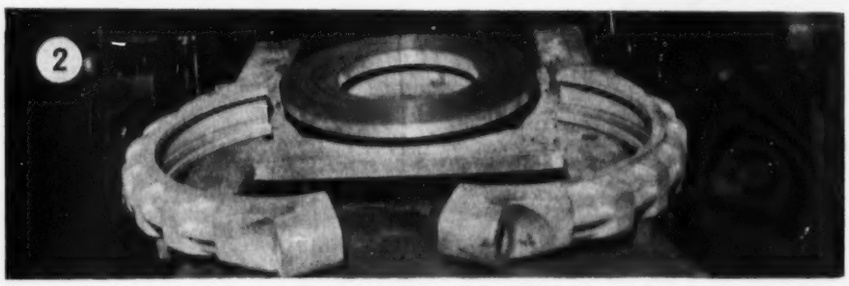
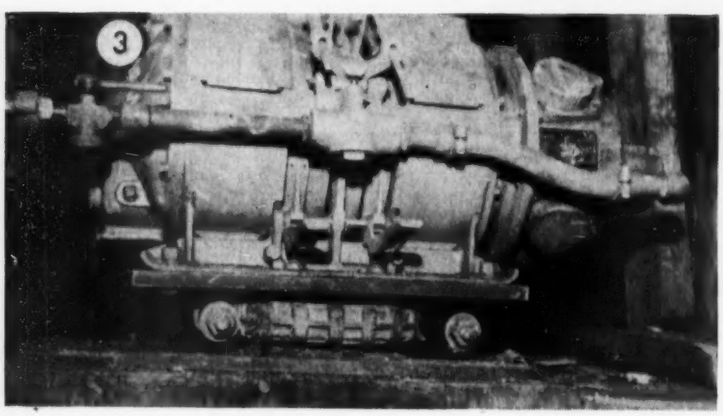
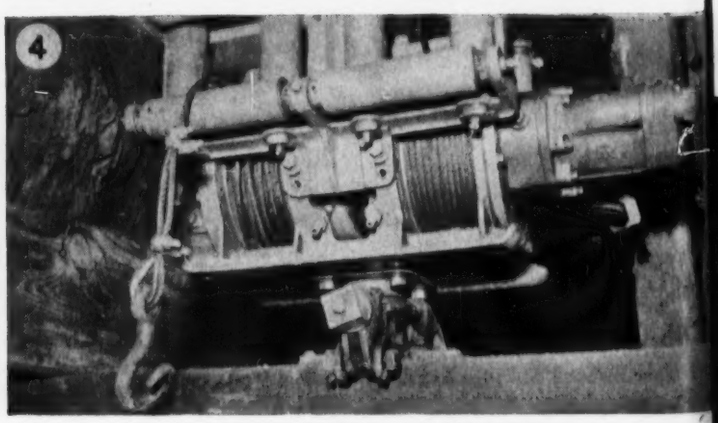



Figure 1



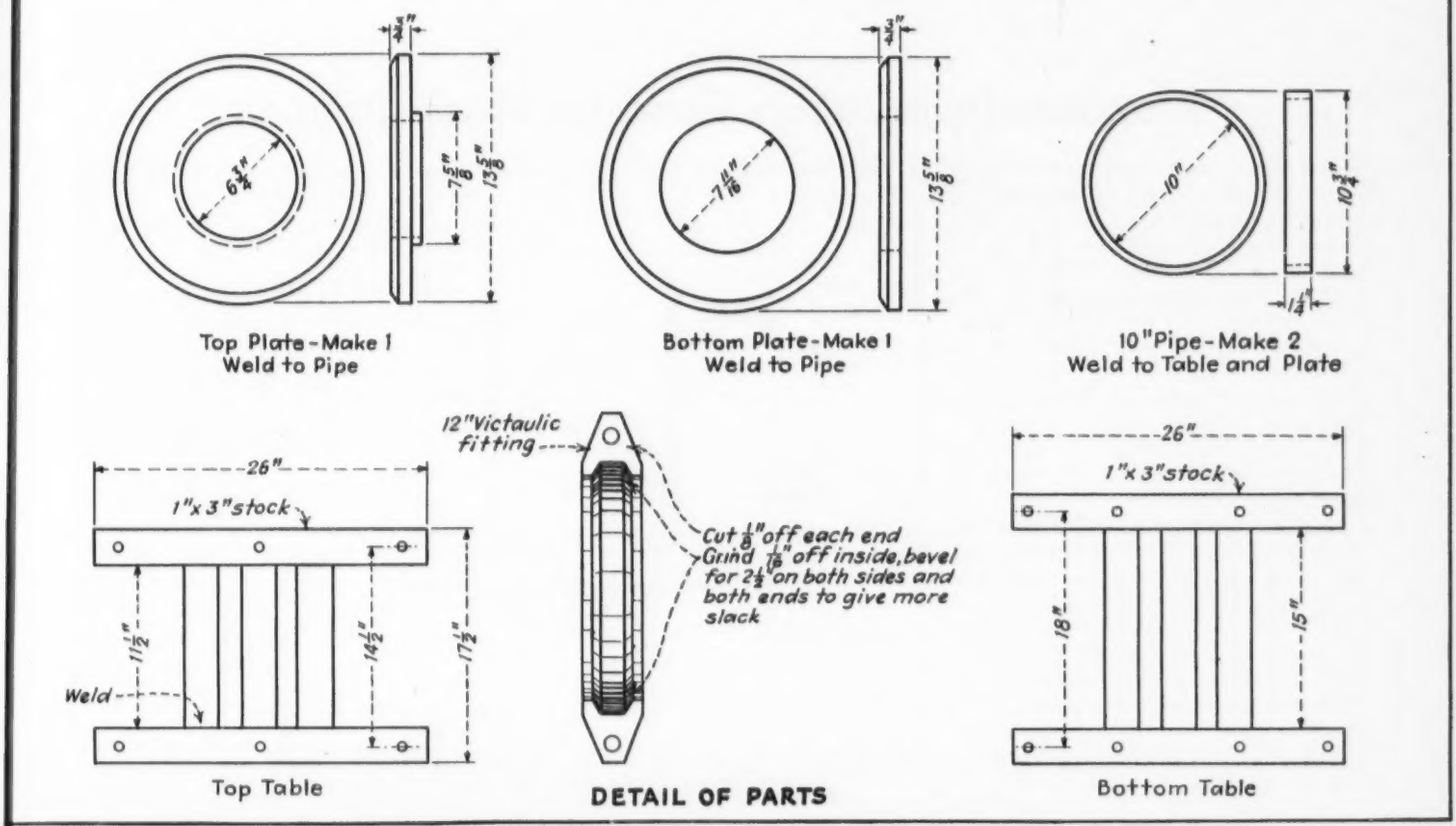
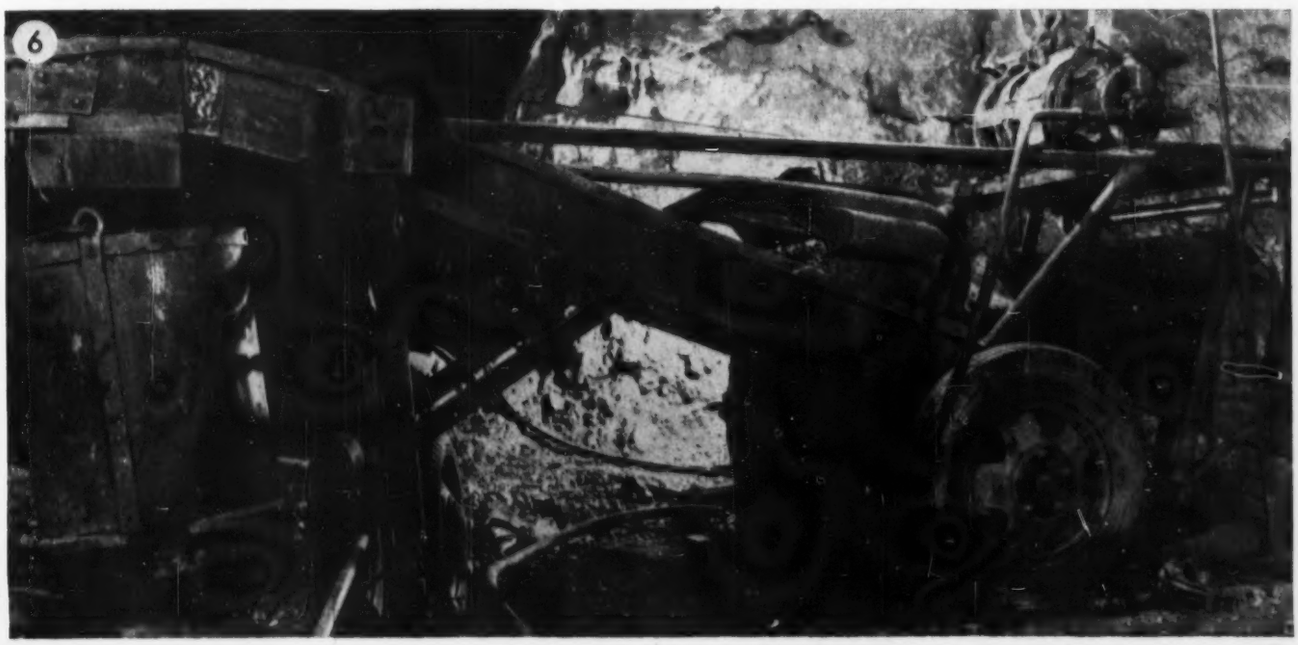
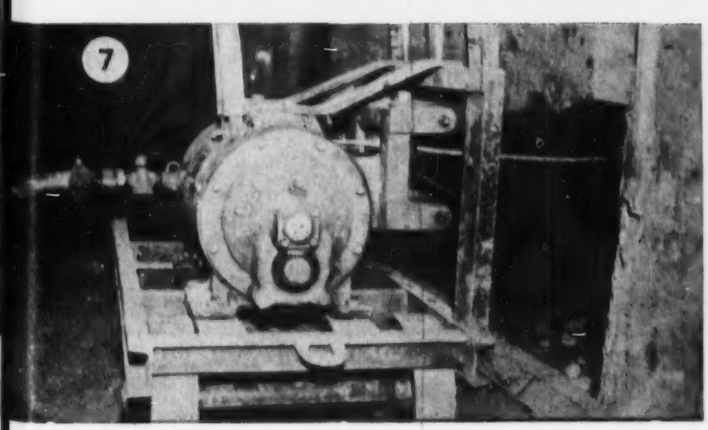
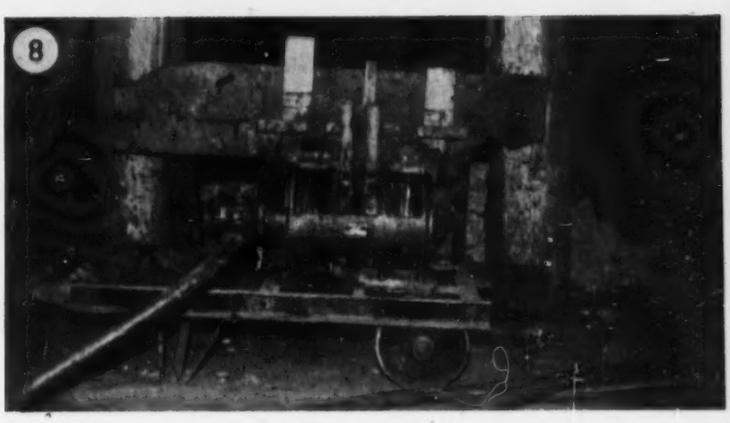

Top Plate - Make 1
Weld to Pipe
Bottom Plate - Make 1
Weld to Pipe
10" Pipe - Make 2
Weld to Table and Plate
12" Victaulic fitting
Cut 1/8" off each end
Grind 1/16" off inside, bevel for 2 1/2" on both sides and both ends to give more slack
26"
1" x 3" stock
Weld
Top Table
DETAIL OF PARTS
Bottom Table

**Figure 5**


6


7

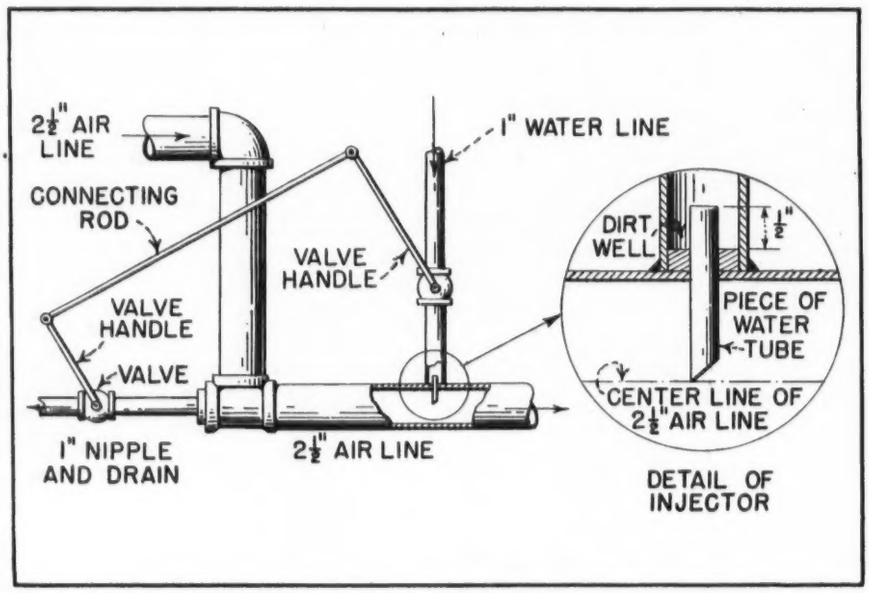

8

# Atomizer Installation Good for Many Rounds

Once this atomizer is installed, it is good for 300 ft. of advance in development headings. Thus it overcomes the objections of miners to atomizers which have to be put on and off pipe lines every shift. R. McQuarrie, mine foreman, of Kimberley, B. C., also points out that it cannot be flooded.

Water, introduced into the air line through a short injector needle, mixes with compressed air and produces an effective fog at the discharge end of the line.

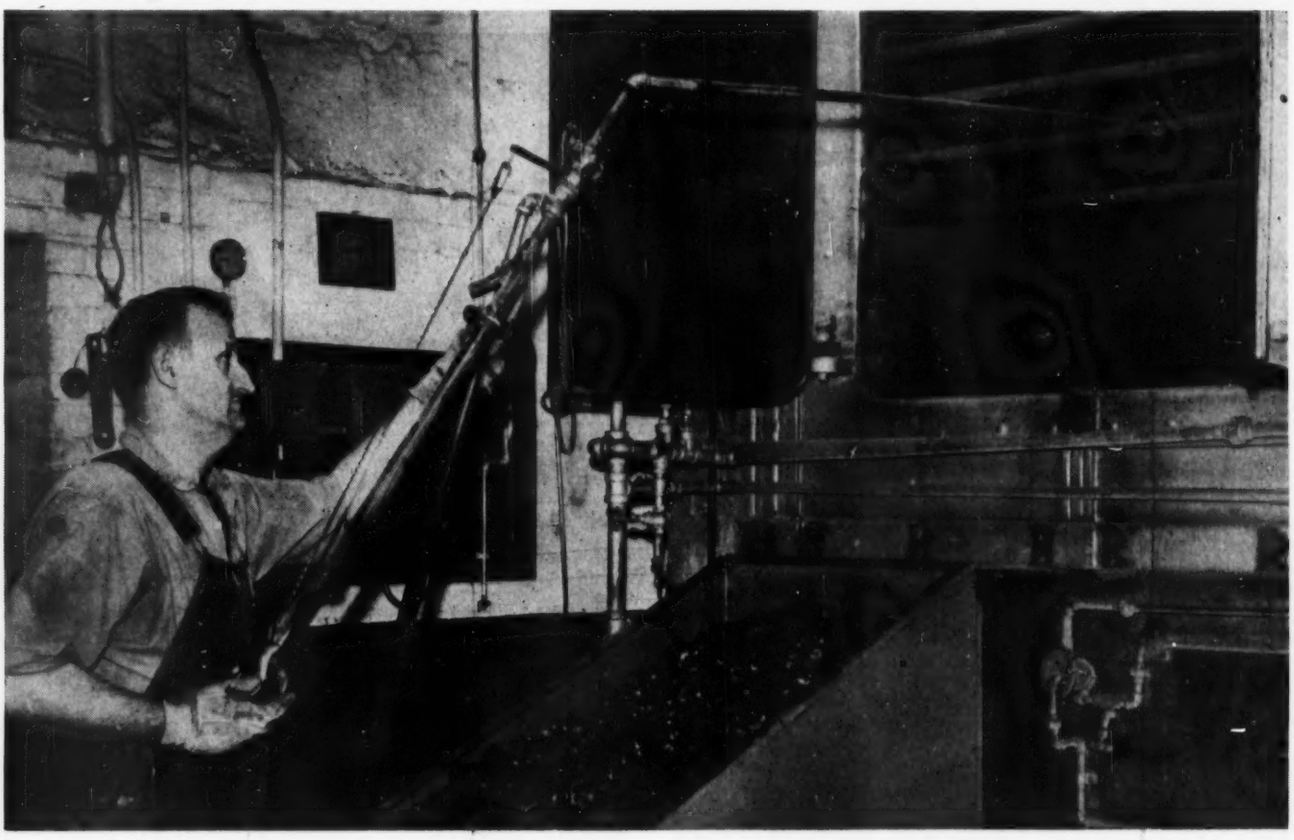
A drain is installed to prevent the air line from being flooded when the air goes off. A valve on the drain line is interlocked with the water inlet valve so that it is impossible to turn water into the air line without also opening the drain valve. After both valves have been set at desired openings, their handles are interlocked by bolting a connecting rod to them.




**WATER injected into the air line produces a fog at the heading.**

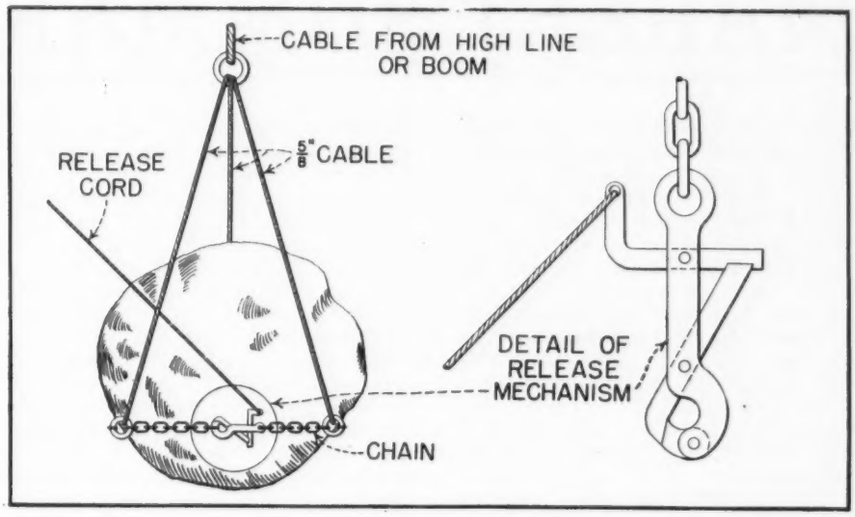
# Boiler Tubes Cleaned With Compressed Air

**AS COMPRESSED AIR is generally available at most mine surface plants, this air-operated boiler-tube cleaner will be of special interest. Compressed air is introduced in pipe from metal hose at left of worker and the air valve is controlled by chain to handle. After soot is dislodged, air is released to blow it out. Photo courtesy Compressed Air Institute.**



# Grapple Chain for Removing Boulders

Hyrdaulic operations employing booms or high lines may find the illustrated grapple chain helpful in removing large rocks from ground that is being sluiced, suggests Burton J. Westman, mining geologist of Etna, Calif. The proposed arrangement consists of a chain wrapped around the lower portion of the boulder. This is suspended from the high line or boom by three lengths of cable. The chain is cinched up tightly and joined by means of a release mechanism similar to those used for testing safety dogs on cages. A 10-lb. pull on the release cord will cause the mechanism to unlock and drop the boulder at any desired point.

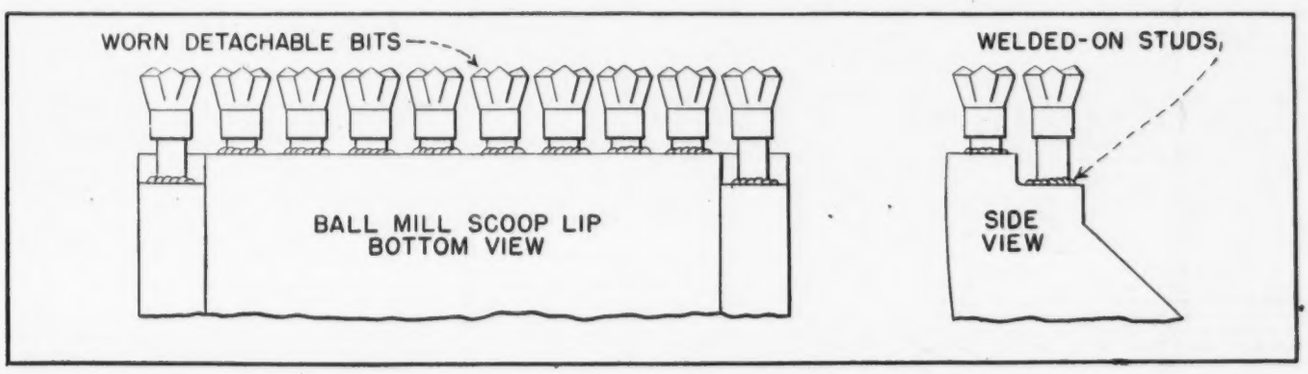



# Shop-Built Clamp Replaces Rock-Drill Water Valve

This simple clamp was made in the machine shop of the Santa Barbara Unit, American Smelting & Refining Co., Chihuahua, Mexico, and devised by Herman Lind, master mechanic. It is used with complete satisfaction on water hoses feeding rock drills, in lieu of conventional water valves. One obvious advantage is that it may be attached to the water hose in any position convenient for the operator. Except for the wing nut, the clamp is made from ½-in. round mild steel.

# Feed Scoop Lip Fitted With Old Bits

At the concentrator of Combined Metals Reduction Co., Pioche, Nev., novel use is made of worn detachable drill bits discarded by the mining department, writes W. G. Fidler, mill superintendent. Attachment of these bits to the lips of ball-mill feed scoops has increased the life of these auxiliary mill parts from the usual 6 weeks, when hard-faced, to nearly 18 months. This is accomplished in the manner shown in the accompanying sketch, and simply involves welding a number of short, threaded steel studs along the cutting end of the lip as indicated. Each ball mill is stopped once a week to change bits, a task that requires little time.



# MARKET SUMMARY

DEMAND FOR MAJOR non-ferrous metals continued at a high level throughout December, even though tension over the strike situation in key industries increased. The feeling prevailed everywhere as 1945 ended that as soon as the labor difficulties are adjusted, the rate of activity in the automotive, building, and other important industries will absorb record peacetime tonnages of copper, lead, and zinc. With production costs rising, the price situation was viewed as firm, and this was reflected in a desire on the part of manufacturers to carry fairly large inventories of raw materials.

Mine production of copper and lead in the United States showed little if any improvement, which makes it necessary to draw on foreign sources for a fairly large tonnage of both metals in order to take care of this country's requirements. Consumers asked for about 43,000 tons of foreign copper for January delivery, and some 23,000 tons of foreign lead will be released for domestic consumption in the same month.

Interest in copper centered in the Government's intentions in regard to purchases of foreign metal. Informed opinion leaned to the view that the buying program, which ended in October, will be resumed, but official word on the plan was lacking as the year ended. The import tariff and exchange complications enter into the problem of marketing foreign copper in the United States under prevailing disturbed conditions. In the first ten months of 1945, Chile alone exported 389,334 tons of copper to the United States. The statistics of Copper Institute covering the first eleven months of 1945 indicate that production of refined copper in the United States in this period amounted to 777,051 tons, whereas total deliveries came to 1,414,328 tons. The difference between production and deliveries was made up largely of foreign copper released by Metals Reserve. The price situation in foreign copper was a little unsettled at times, but the average quotation continued on the basis of 11.75c., f.a.s. Atlantic ports.

Domestic copper was purchased freely on the basis of 12c., Connecticut, with wire and cable mills particularly active. Fabricators consumed 100,400 tons of copper in November, against 108,048 tons in October. The figure for November would have been larger except for strikes at some plants.

Demand for lead was brisk. CPA re-

## Major Metals

### U. S. DAILY AND AVERAGE PRICES

| 1945 Dec. | Electrolytic Copper: Domestic (a) Refinery | Electrolytic Copper: Export (b) Refinery | Straits Tin: New York | Lead: New York | Lead: St. Louis | Zinc: St. Louis |
|---|---|---|---|---|---|---|
| 1 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 3 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 4 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 5 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 6 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 7 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 8 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 10 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 12 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 13 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.26 |
| 14 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 15 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 17 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 18 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 19 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 20 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 21 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 22 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 24 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 25 | Holiday | Holiday | Holiday | Holiday | Holiday | Holiday |
| 26 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 27 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 28 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 29 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 31 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| **AVERAGES FOR MONTH** | | | | | | |
| Dec. | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| **AVERAGES FOR WEEK** | | | | | | |
| 5 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 12 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 19 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 26 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| **CALENDAR WEEK AVERAGES** | | | | | | |
| Dec. 1 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 8 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 15 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 22 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |
| 29 | 11.775 | 11.700 | 52.000 | 6.50 | 6.35 | 8.25 |

THE above quotations for major non-ferrous metals are our appraisal of the important United States markets, based on sales reported by producers and agencies. They are reduced to the basis of cash, New York or St. Louis, as noted. All prices are in cents per pound.

(a) Net prices at refineries on Atlantic seaboard. To arrive at the delivered New England basis add 0.225c. per pound, the average differential for freight and delivery charges.

(b) Export prices are net at refineries on the Atlantic seaboard and include sales of domestic copper in the foreign market. Owing to the World War and the disruption of normal trade relations, our export copper quotations, since September, 1939, have been based largely on f.a.s. transactions, ex United States ports. We deduct .05c. from the f.a.s. basis (lighterage, etc.) to arrive at the f.o.b. refinery quotation.

Copper, lead and zinc quotations are based on sales for both prompt and future deliveries; tin quotations are for prompt delivery only.

Quotations for copper are for the ordinary forms of wirebars and ingot bars; cathodes are sold at a discount of 0.125c.

Quotations for zinc are for ordinary Prime Western brands. Zinc in New York commands a premium over the St. Louis basis equal to the freight differential. Contract prices for High Grade zinc delivered in the East and Middle West in nearly all instances command a premium of 1c. per pound over the current market for Prime Western but not less than 1c. over the *Engineering and Mining Journal's* average quotation for Prime Western for the previous month.

Quotations for lead reflect prices obtained for common lead.

## Silver, Gold and Sterling

### DAILY AND AVERAGE PRICES

| 1945 Dec. | Sterling Exchange: "Checks" | Silver (c): New York | Silver (c): London | Gold: London | Gold (d): United States |
|---|---|---|---|---|---|
| 1 | 403.000 | (e) | (e) | (e) | $35.000 |
| 3 | 403.000 | 70.750 | 44d. | 172s. 3d. | 35.000 |
| 4 | 403.000 | 70.750 | 44d. | 172s. 3d. | 35.000 |
| 5 | 403.000 | 70.750 | 44d. | 172s. 3d. | 35.000 |
| 6 | 403.000 | 70.750 | 44d. | 172s. 3d. | 35.000 |
| 7 | 403.000 | 70.750 | 44d. | 172s. 3d. | 35.000 |
| 8 | 403.000 | (e) | (e) | (e) | 35.000 |
| 10 | 403.000 | 70.750 | 44d. | 172s. 3d. | 35.000 |
| 11 | 403.000 | 70.750 | 44d. | 172s. 3d. | 35.000 |
| 12 | 403.000 | 70.750 | 44d. | 172s. 3d. | 35.000 |
| 13 | 403.000 | 70.750 | 44d. | 172s. 3d. | 35.000 |
| 14 | 403.000 | 70.750 | 44d. | 172s. 3d. | 35.000 |
| 15 | 403.000 | (e) | (e) | (e) | 35.000 |
| 17 | 403.000 | 70.750 | 44d. | 172s. 3d. | 35.000 |
| 18 | 403.000 | 70.750 | 44d. | 172s. 3d. | 35.000 |
| 19 | 403.000 | 70.750 | 44d. | 172s. 3d. | 35.000 |
| 20 | 403.000 | 70.750 | 44d. | 172s. 3d. | 35.000 |
| 21 | 403.000 | 70.750 | 44d. | 172s. 3d. | 35.000 |
| 22 | 403.000 | (e) | (e) | (e) | 35.000 |
| 24 | 403.000 | 70.750 | Holiday | Holiday | 35.000 |
| 25 | Holiday | Holiday | Holiday | Holiday | Holiday |
| 26 | 403.000 | 70.750 | Holiday | Holiday | 35.000 |
| 27 | 403.000 | 70.750 | 44d. | 172s. 3d. | 35.000 |
| 28 | 403.000 | 70.750 | 44d. | 172s. 3d. | 35.000 |
| 29 | 403.000 | (e) | (e) | (e) | 35.000 |
| 31 | 403.000 | 70.750 | 44d. | 172s. 3d. | 35.000 |
| **AVERAGES FOR MONTH** | | | | | |
| Dec. | 403.000 | 70.750 | 44d. | — | 35.000 |
| **AVERAGES FOR WEEK** | | | | | |
| 5 | 403.000 | 70.750 | — | — | |
| 12 | 403.000 | 70.750 | — | — | |
| 19 | 403.000 | 70.750 | — | — | |
| 26 | 403.000 | 70.750 | — | — | |

Calendar week averages, New York Silver: Dec. 1st, 70.750; 8th, 70.750; 15th, 70.750; 22nd, 70.750; 29th, 70.750.

(e) Not quoted (Saturday).

(c) Silver other than newly-mined domestic, by Handy & Harman. Under Treasury order of July 6, 1939, the price on domestic newly-mined silver mined subsequent to July 1, 1939, was fixed at 71.11c. per troy ounce. Handy & Harman's quotation on newly-mined domestic silver 999 fine was 70⅝c throughout December.

London silver in pence per troy ounce.

(d) U. S. Treasury's gold price. Actual payment by the United States Treasury for gold in domestic and imported ore or concentrate is at 99.75 per cent of the price quoted by the Treasury, which is equal to $34.9125.

duced first-quarter quotas for production of passenger car batteries and tetraethyl to check the rising trend in consumption of the metal. Production of refined lead in the United States in November amounted to 47,824 tons, of which 39,991 tons was obtained from domestic ore and 7,833 tons from foreign ore and secondary material. Metals Reserve allocated 29,464 tons of foreign lead to domestic consumers in December.

A strike at plants operated by the American Zinc, Lead & Smelting Co. reduced production of slab zinc in December. Demand for Prime Western and Special High Grade zinc was fairly active. The $5 per ton smelting subsidy involving Tri-State and Wisconsin concentrates ended Dec. 31, 1945.

Extension of the Green Act, under which unpledged Treasury silver was made available to industry, was postponed until after Congress reconvenes in the middle of January. Senators representing silver-producing areas favored raising the price to $1.29.

Reports from the tin-producing districts of the Far East were more encouraging, and production on a limited scale is expected before summer.

## Miscellaneous Metals Monthly Averages

Average prices of miscellaneous metals for November and December:

(a) New York, packed in cases, in lots of 5 tons or more but less than a carload. (b) Nominal. (c) Producer's price for commercial sticks. (d) Average producers' and platers' quotations. (e) Special shapes sold to platers.

| | Nov. | Dec. |
|---|---|---|
| Quicksilver, N. Y. flask | 106.870 | 108.000 |
| Antimony (a) | 15.839 | 15.839 |
| Antimony, bulk, Laredo | 14.500 | 14.500 |
| Antimony, bulk, N. Y. | 15.265 | 15.265 |
| Antimony, Chinese (b) | 16.500 | 16.500 |
| Platinum, oz. troy | 35.000 | 35.000 |
| Cadmium (c) | 90.000 | 90.000 |
| Cadmium (d) | 92.500 | 92.500 |
| Cadmium (e) | 95.000 | 95.000 |
| Aluminum ingot | 15.000 | 15.000 |

## Yearly Average Prices—1941-1945

| | 1941 | 1942 | 1943 | 1944 | 1945 |
|---|---|---|---|---|---|
| Copper, domestic, f.o.b. refinery | 11.797 | 11.775 | 11.775 | 11.775 | 11.775 |
| Copper, export, f.o.b. refinery | 10.901 | 11.684 | 11.700 | 11.700 | 11.700 |
| Lead, common, New York | 5.793 | 6.481 | 6.500 | 6.500 | 6.500 |
| Lead, common, St. Louis | 5.643 | 6.331 | 6.350 | 6.350 | 6.350 |
| Zinc, Prime Western, St. Louis | 7.474 | 8.250 | 8.250 | 8.250 | 8.250 |
| Tin, Straits, New York | 52.018 | 52.000 | 52.000 | 52.000 | 52.000 |
| Silver, foreign, New York | 34.783 | 38.333 | 44.750 | 44.750 | 51.928 |
| Quicksilver (per flask 76-lb.) | $185.023 | $196.346 | $195.208 | $118.358 | $134.889 |
| Antimony, domestic, New York | 14.000 | 15.559 | 15.928 | 15.839 | 15.839 |
| Platinum, refined | $36.000 | $36.000 | $35.083 | $35.000 | $35.000 |
| Cadmium (producers' quotation) | 88.443 | 90.000 | 90.000 | 90.000 | 90.000 |
| Aluminum, 99 plus percent | 16.500 | 15.000 | 15.000 | 15.000 | 15.000 |

## Miscellaneous Metals, Ores, Minerals

Quotations cover wholesale lots, prompt shipment, f.o.b. New York, unless otherwise stated

### MISCELLANEOUS METALS

(Jan. 1, 1946)

| | |
|---|---|
| Aluminum, ingot, 99 plus per cent, lb. | 15c. |
| Antimony, domestic, spot, lb., 5 tons or more | 15.839c. |
| Bismuth, ton lots, lb. | $1.25 |
| Cadmium, commercial sticks, lb. | 90c. |
| Calcium, lb., ton lots, 97 @ 98 per cent, cast | $1.85 |
| Chromium, 97 per cent grade, lb. | 89c. |
| Cobalt, 97 to 99 per cent, per lb. | $1.50 |
| Indium, troy oz. | $2.25 |
| Nickel, electrolytic cathodes, lb. | 35c. |
| Magnesium, 99.8 per cent, carloads, lb. | 20½c. |
| Palladium, troy oz. | $24.00 |
| Platinum (Official quotation) troy oz. | $35.00 |
| Quicksilver, flask of 76 lb., 25 flasks or more | $108.00 |
| Selenium, 99.5 per cent, lb. | $1.75 |
| Silicon, minimum 97 per cent, spot, carloads, lb. | 14.75c. |
| Tellurium, lb. | $1.75 nom. |
| Thallium, 100 lb. or more, lb. | $12.50 nom. |
| Titanium, 96 to 98 per cent, lb. | $5.00 |

### METALLIC ORES

| | |
|---|---|
| Beryllium Ore, 8 to 12% BeO, f.o.b. mine, per unit | $8.00@$10.00 |
| Chrome Ore, per long ton, f.o.b. cars Atl. ports, dry 48% | |
| $Cr_2O_3$, 2.8 to 1 ratio | $41.00 |
| 48% $Cr_2O_3$ 3 to 1 ratio | $43.50 |
| Iron Ore, Lake Superior, Lower Lake ports, long ton: | |
| Old Range bessemer | $4.95 |
| Mesabi bessemer | $4.70 |
| Old Range non-bessemer | $4.80 |
| Mesabi, non-bessemer | $4.55 |
| Lead (Galena) 80 per cent, Joplin, Mo., ton | $76.01 |
| Manganese, Metals Reserve Co. sales price, per long-ton unit of Mn contained, 48 per cent, subject to premiums and penalties, effective May 15, 1944: 85c. (duty paid) New York, Philadelphia, Baltimore, Norfolk, Mobile, and New Orleans; 91c., Fontana, Calif., Provo, Utah, and Pueblo, Colo. | |
| Molybdenum Ore, 90%, per lb. of $MoS_2$ f.o.b. mines | 45c. |
| Tungsten Ore, per unit of $WO_3$: | |
| Chinese, 60 per cent, duty paid | $24.00 |
| Domestic, 60 per cent and upward | $24.00 |
| Vanadium Ore, per lb. of contained $V_2O_5$ f.o.b. mines | 2½c. |
| Zinc Ore, Prime, 60 per cent concentrate, Joplin, Mo.; per ton. (a) Prices at mines, small lots, normally several dollars less. | $55.28 |

### METALLIC COMPOUNDS

| | |
|---|---|
| Arsenic Oxide (arsenic) lb. | 4c. |
| Cobalt Oxide, 70 @ 71 per cent, lb. | $1.06 |
| Copper Sulphate, 100 lb. | $5.00 |

### ALLOYS

| | |
|---|---|
| Beryllium Copper, 2.5 to 3 per cent Be, per lb. of contained Be | $15.00 |
| Ferrochrome, 65 @ 70 per cent per lb. of Cr contained | 13c. |
| Ferromanganese, 78 @ 82 per cent, gross ton | $135.00 |
| Ferromolybdenum, 55 @ 65 per cent Mo, lb. of Mo contained | 95c. |
| Ferrosilicon, 50 per cent, per lb. of contained Si | 6.60@8.10c. |
| Ferrotungsten, 75 @ 80 per cent, lb. of W contained | $1.90 |
| Ferrovanadium, per lb. of V delivered | $2.70@$2.90 |
| Silicomanganese, 1 per cent C, gross ton | $138.00 |

### NON-METALLIC MINERALS

| | |
|---|---|
| Asbestos, f.o.b. Canadian (Quebec) mines (U. S. funds), ton: | |
| Crude No. 1 | $650@$758 |
| Crude No. 2 | $165@$385 |
| Spinning fibers | $124@$233 |
| Paper stock | $44@$49.50 |
| Shorts | $14.50@$26.50 |
| Vermont, f.o.b. Hyde Park: | |
| Shingle stock | $62.50@$65.00 |
| Paper stock | $44.00@$53.00 |
| Shorts | $14.50@$28.50 |
| Floats | $19.50 |
| Barytes, f.o.b. mines: | |
| Georgia, crude, per long ton | $8.50@$9.00 |
| Missouri, 93 to 94 per cent $BaSO_4$, per short ton | $8.25@$8.50 |
| Bauxite, long ton: | |
| Domestic, crude, 50 @ 52 per cent (not dried) | $5.00 |
| Domestic, chemical, 55 @ 58 per cent | $7.50@$8.50 |
| Domestic, abrasive, 80 @ 84 per cent | $16.50 |
| China Clay, f.o.b. mines, ton: | |
| South Carolina and Georgia, No. 1, bulk | $6.75@$8.00 |
| Delaware, No. 1 | $15.00 |
| Feldspar, bulk, ton: | |
| Potash feldspar, 200 mesh | $17.00 |
| Glass spar, white, 20 mesh | $11.75 |
| Fluorspar, f.o.b. mines, bulk, Kentucky and Illinois 60 per cent, all rail movement, ton | $30.00 |
| Acid 98 and 1 per cent, bulk, ton | $37.00 |
| Fuller's earth, f.o.b. Georgia or Florida, ton | $7.00@$14.00 |
| Magnesite, per ton dead-burned, f.o.b. Washington | $22.00 |
| Mica—Colonial Mica Corp., agent for Metals Reserve Co., quoted full-trimmed ruby muscovite domestic, April 1 to Sept. 30, inclusive—No. 1, $1.70 to $36.65 per lb., depending on size; No. 2, $1.25 to $26.00; No. 2 Inferior, 50c. to $16.00; No. 3, 25c. to $6.25. Prices f.o.b. nearest producer's rifting plant. Current quotations nominal. | |
| Ocher, Georgia, ton | $19.00@$22.00 |
| Pyrites, Spanish, per long ton unit of S, c i f. Atlantic ports | 12c. nom. |
| Silica, in bags, 325 mesh, ton | $20.00@$40.00 |
| Sulphur, Texas, mines, long ton | $16.00 |
| Talc, f.o.b. works, ton: | |
| New York, double air-floated, 325 mesh | $12.00@$15.00 |
| Vermont, extra white, 200 mesh | $9.50@$10.50 |
| Tripoli, Missouri, ton: | |
| 40 mesh, cream colored | $14.50 |

### IRON AND STEEL

| | |
|---|---|
| Pig Iron, Valley furnaces, gross ton: Basic | $25.25 |
| Steel, base price, Pittsburgh Billets, gross ton | $36.00 |
| Structural shapes, 100 lb. | $2.10 |

# WASHINGTON REFLECTIONS

*McGRAW-HILL WASHINGTON NEWS BUREAU*

## McCarran Blasts Ickes' Public Land Administration

Senator McCarran vigorously attacked the Department of the Interior for the manner in which public lands have been administered and for the policy of withdrawal pursued by the Department, particularly under the administration of Secretary Ickes. The occasion was the presentation of the Third Partial Report of the subcommittee of the public lands and surveys which has been investigating General Land Office actions. This report—No. 808—dealt with some of the public land withdrawals in Utah, their relation to oil, potash, and magnesium resources, and with the executive authority to make withdrawals.

Both the legality of the actions and the motives which prompted the withdrawals were questioned by the Senator in a completely documented statement in which he specifically recommended, that "the Congress should by affirmative legislation provide that (1) prior to the issuance of a withdrawal order there shall be a public hearing or hearings in the State or States affected, and (2) that temporary withdrawals shall be limited to periods of two years, unless approved by the Congress with provision for a limited number of renewals, under strictly prescribed conditions." "My committee," said Senator McCarran, "renews its recommendation that all existing withdrawals be carefully re-examined with a view to rescinding or modifying those which cannot be justified on the record."

More will be heard from the Senator on this subject. He pointed out that one withdrawal order covering nearly 2,000,000 acres "was prepared and promulgated under an alleged authority, which, in my judgment, has not the remotest basis in law. It was based on one of the most flagrantly distorted departmental interpretations of a statute that has ever come to my attention. Yet, after 12 years, the land withdrawal still stands to plague an important industry in eastern Utah and to prevent the development of some of the richest resources in that State."

The Senator explained that the Department based its action on the Withdrawal Act of 1910 and that as a result the locating and mining of both metallic and non-metallic minerals under the mineral leasing laws was not affected. "It is highly significant, however," continued the Senator, "that from the time the withdrawal order became effective not a single prospecting permit or lease in the area has been approved," although there were several hundred applications on file.

Inquiry at Senator McCarran's office reveals that the Senator expects to introduce legislation which will carry out the committee recommendations. Clarification of the rules and regulations by which public lands are withdrawn from homestead entry or appropriation will be of great aid to the mining industry as well as the chemical, fertilizer, and grazing industries. Particular attention is to be paid to provisions which will define exactly what "temporary withdrawal" means and to provide for periodic re-examination and termination of withdrawals which have served the original purposes.

## Six Government Magnesium Plants Will Be Continued

Lack of a firm market for magnesium was indicated to be the stumbling block to the orderly disposal of Government magnesium plants in a report recently submitted to Congress by W. Stuart Symington, Surplus Property Administrator. Demand five years hence was estimated to be 33,000 tons per year at the most. Present privately owned capacity is 30,000 tons per year, approximately 10 percent of the total capacity in the country. Mr. Symington concluded, "There is little likelyhood of a peacetime market for the bulk of the capacity of such Government plants as should be kept available for magnesium production in the interests of national security."

The Dow Chemical Co., in addition to owning 18,000 tons of the lowest-cost private capacity, has prior rights to 45,000 tons in the most efficient Government plants. This presents the problem of "how to provide a fair competitive status to new companies." Briefly the Board proposes to sell or lease six of the thirteen Government plants "on the condition that plant capacity will be maintained in standby condition for magnesium production to the extent that it does not engage partially or completely in the production of magnesium for the commercial market or for Government stockpile."

The plants proposed for this program are Dow Chemical, Freeport, Tex., 9,000 tons; Dow Magnesium, Velasco, Tex., 36,000 tons; Diamond Magnesium, Painesville, Ohio, 18,000 tons; Magnesium Reduction, Luckey, Ohio, 5,000 tons; Electro Metallurgical, Spokane, Wash., 24,000 tons; New England Lime, New Canaan, Conn., 5,000 tons.

The report shows that only the Diamond plant can compete on a cost basis. Its cost of production is 16½c. per pound, compared to cost at the Dow plants of 12.1c. or less. However, in the Diamond figure there is an item of 4.77c. for power and another of 5.19c. for raw material, both of which probably could be lowered. The power costs per pound of magnesium are higher at the Painesville plant than at any other electrolytic plant in the country except the Dow plant at Marysville. Diamond's raw material is a waste product from one of the company's other operations and probably could be furnished at a much lower figure. Reasons for the selection of the four plants not operated by Dow were stated in the report to be:

"1. Three of the four present operators are interested in possible future operation. They have strong research staffs and are willing to engage in further experimentation.

"2. The plants involve a variety of processes, are relatively low cost, and are geographically well dispersed.

"3. Three of the plants have made other valuable war products in the same facilities: metallic calcium, metallic sodium, and calcium hypochlorite."

The seven other Government-owned plants, with a capacity of 166,000 tons per year, were recommended for disposal for other purposes than the production of metal. "These plants are uneconomic producers with either high operating costs or poor locations, or are in poor physical condition."

## Lead Shortage Threatens Continuing Difficulty

The lead situation continues to tighten, and it is possible that the restricted allocations of the first quarter of 1946 may be the forerunner of more drastic cuts in the second quarter. This is merely another indication of the uncertainty that surrounds the future lead supply. A shortage of lead seems to be both the short and long term outlook.

This position was confirmed by the Bureau recently in a report that the country is facing a serious shortage of lead due to the wartime depletion of high-grade ores. Higher prices for lead were forecast, as the mines will have to depend on lower-grade reserves.

Expected production next year and

the following years will be far below domestic requirements unless, of course, some new rich deposits of real magnitude are found.

This country is competing with all others for the lead that may be available in the world market. The end of the Combined Raw Materials Board not only ended the allocation of lead on a world-wide scale but also ended the means of enforcing comparable uses in consuming countries.

At home the big trouble is labor supply. Lack of an adequate labor force is limiting lead production now as it did during most of the war. Wartime labor shortages in the mines also resulted in rapid depletion of developed reserves. It will take time for any addition to the labor force to be reflected in greater production, because of the need for development work.

Just when additional labor will be available for the mines is not apparent. Statistics of the Department of Labor indicate that October was the first month since the war began that the lead and zinc industries held their own in employment.

Considering the world supply and demand picture, unless we raise prices foreign lead will not be available to the United States market in 1946 in anything near the quantity imported in 1945. Production of recoverable lead from domestic mines during 1945 is estimated to be about 385,000 tons, against 416,000 tons in 1944.

According to Government figures, released when the first quarter allocations were announced, the lead stockpile will be down to 50,000 tons by the end of March. Officials do not consider 50,000 tons enough to cushion further losses in imports or domestic production.

C.P.A. plans to require consumers to use some antimonial lead now stored at the smelters if the customers can use it in place of refined metal. If the plans to balance supply and demand fail, cuts must be made in consumption.

## Stockpile Bill Fails to Pass House Before Recess

The Senate passed the stockpile bill (S-752) on Dec. 20 and sent the measure to the House. No important changes were made in the bill as revised by the Committee on Military Affairs. However, the House failed to take action before the Christmas recess, so that passage was delayed until after the recess.

The clauses in the Surplus Property Act of 1944 dealing with mineral stockpiling provided that strategic and critical minerals declared surplus by Government agencies prior to Jan. 3, 1946, should go into the emergency stockpile created by the 1939 law. There was no mandate as to what should happen to material declared surplus after Jan. 3, it being presumed that Congress would enact new stockpiling legislation in the interim.

In order to dispel uneasiness over what would happen to materials declared surplus after Jan. 3 in the absence of new stockpiling legislation, the Surplus Property Board issued a directive extending the policy of the Surplus Property Act until April 3, 1946. Thus the mining industry is safeguarded against indiscriminate dumping of surpluses into its markets pending the passage of new stockpiling legislation to establish a permanent policy.

## Lease of Arkansas Plants to Reynolds Approved by RFC

The RFC has notified the Reynolds Metals Co. that it has approved the company's offer to lease the Government-owned Hurricane Creek, Ark., alumina plant and the Jones Mill, Ark., aluminum reduction plant. Leasing of these plants is subject to the approval of W. Stuart Symington, Surplus Property Administrator, and the Department of Justice, with the proviso that the royalties which will be required by the Aluminum Company of America on certain alumina facilities be satisfactory to RFC.

Reynolds, under the terms of the offer, will lease the two plants for five years on a rental basis with a minimum payment to the Government during the period in excess of $6,000,000, and a maximum payment for the same period of approximately $12,000,000, with an option to purchase at the expiration of this lease period. In addition, Reynolds will pay all real estate taxes and insurance costs, furnish the needed working capital, and assume all losses, if any, from the operations. The terms provide for the sale of alumina produced at Hurricane Creek above Reynolds' needs to others at cost plus 6 percent. No Government subsidy of any kind is involved.

The plant at Hurricane Creek cost $39,330,523, and is capable of producing 1,555,000,000 lb. of alumina a year. Jones Mill, cost $29,258,349, has a rated capacity of 144,000,000 lb. of pig aluminum a year. However, it has a power plant capable of producing only half the energy required for full operation. Reynolds plans an annual production of 72,000,000 lb. of aluminum at this plant, the company declared.

Officials of Reynolds stated last week that the company is interested in acquiring other Government-owned aluminum plants, among them plants operated by Alcoa at Troutdale, Oregon, and Spokane, Wash.

In the report to Congress of the Surplus Property Board on Government-owned aluminum plants and facilities, released Sept. 21, the economic problems involved are summarized as follows:

"By law, the Government plants should be disposed of in such a way as to foster competition in the aluminum industry. More competition would probably expand the use of aluminum and thus result in greater employment and production in the industry. It would also strengthen national defense. But a series of problems must be individually faced by the Surplus Property Board in its effort to carry out the law. These problems are principally:

"(1) The raw material, bauxite, is not readily available to new producers; (2) only some of the Government's aluminum plants are economical for competitive operation, and plant adjustments may be necessary; (3) the costs of power from Federal projects are subject to inflexible rate policies; (4) the total primary aluminum capacity in the country that is economical exceeds the requirements of immediate postwar markets; and (5) the volume of war-surplus secondary aluminum is so great that the manner in which it is disposed will determine how much primary metal will be needed for at least five postwar years.

"In view of these problems it will take time for new operators to obtain bauxite, to develop markets, and to establish themselves firmly in the industry. During this time, the Government can dispose of certain key plants under liberal leasing arrangements, with purchase options, and also provide other assistance to facilitate operations. Some fabricating plants and scrambled facilities can probably be sold now, but other fabricating capacity will only be disposable later."

The report to Congress states that the opinion of the Circuit Court, in the anti-trust decision, pointed out that the question of future dissolution or reorganization of Alcoa would be affected by the success or failure of the Surplus Property Board in promoting competition through the disposal of Government plants.

## Survey Head Comments On Mineral Reserves

In an address to a foreign trade group on Nov. 12, W. E. Wrather, Director of the U. S. Geological Survey, outlined the mineral position of the United States. He emphasized the exhaustibility of mineral reserves and the imminence of shortages in certain minerals. He pointed out that reserve estimates are always subject to change, but that in several cases unusual results must be achieved if a comfortable reserve position is to be realized.

"The collective enterprise and initiative that has made this nation great has been nourished through the years by a natural heritage of abun-

(*Continued on page* 138)

# NEWS OF THE INDUSTRY

## Industry Members Discuss Federal Policies and Frame Resolutions at Northwest Mining Meeting

Chief topic discussed at the 51st annual meeting of the Northwest Mining Association in Spokane, Wash., on Dec. 7 and 8, included government land policies, taxation, financing of mining ventures, labor matters, and the outlook for the metals. Officials responsible for general program were James L. Leonard, P. C. Feddersen, H. P. Sherman, Bliss Moore, Evan Oscarson, W. J. Nicholls, J. W. Melrose, and C. A. R. Lambly.

The meeting was opened by Charles E. Marr, president. Local mining problems were aired by Harry Marsh, secretary, Idaho Mining Association; Carl Trauerman, secretary, Montana Mines Association; George H. Waterman, president, West Coast Mineral Association; Frank Lilly, secretary, Washington Prospectors' Association; and A. E. Jukes, president, British Columbia Chamber of Mines. Evan Oscarson and Wellman Clarke read a paper entitled "Federal, State, and County Mineral Land Policies," with Mr. Clarke pointing out future trends and offering the following recommendation: (1) To oppose the existing policies of the Federal Government toward leasing mineral lands; (2) urge each of the mining states to remove restrictions on the acquisition of title to mining lands by location; and (3) urge state laws requiring county commissioners to sell county-owned land for mine development purposes. At the noon luncheon Dr. Philip Shenon described work of geologists and mining engineers in Pacific invasions.

H. G. Washburn and Elmer Johnston presided at the afternoon session given over to educational, labor and finance problems. Dr. A. W. Fahrenwald, dean, School of Mines, Idaho University, emphasized the need for training "mineral engineers" because of shortages.

Elmer Johnston led off the panel discussion on SEC. Edward Bloom, W. A. Clark, Carl Trauerman, and others took an active part in the proceedings, citing examples as to how SEC procedures have actually restricted opening of new mines, and the futility of efforts to operate under present exemption rules. Chairman Johnston outlined several specific changes which the mineral industry has demanded of Congress to finance new projects and create employment, and Trauerman pointed out the need for a national public relations unit to reform and guide the SEC and other agencies.

J. B. Haffner and C. A. R. Lambly presided over the Saturday morning session. Frank E. Woodside, manager, British Columbia and Yukon Chamber of Mines, presented a report on the progress of mining in Western Canada. Milnor Roberts, dean, School of Mines, University of Washington, spoke on the opportunities ahead in the Pacific Northwest, reviewing some of the established metal and non-metallic areas. Anton Monez pointed out the importance of the Alcan Highway and its relation to mining. Sheldon Glover, head of the Division of Mines and Geology of the State of Washington, reviewed the mining situation in the State. W. A. Richelsen, Alaska and Seattle representative of Kennecott Copper Corporation, discussed "Future for Mining Exploration," during which he reviewed the mineral-producing areas of the United States and Alaska.

J. J. Curran and P. C. Feddersen directed the afternoon session, in which a planning of postwar development of resources of the State of Washington was discussed by Art Garton, director of the Department of Development and Conservation.

H. A. Doerner, U. S. Bureau of Mines, Pullman, Wash., explained perfection of the electro-thermal process using carbon for the production of metallic magnesium from magnesite ore occurring in the Spokane area. Wallace G. Woolf reviewed the zinc situation in his paper "Outlook for Zinc." The open panel discussion on taxes closing the afternoon session, in which T. R. Toole, C. P. A., Spokane, and P. Jessup, attorney, and L. Randell, C. P. A., both of Wallace, Idaho, took a prominent part.

Resolutions presented by a committee of which J. B. Haffner, of the Bunker Hill & Sullivan Company, was chairman, were adopted almost unanimously. They declare that labor should be amenable to law and that Government should appear in labor disputes only as a conciliator; that the Association does not believe in compulsory arbitration; that the tariff should favor domestic metal production; that the Government's metal stocks should be stockpiled only for national defense, and that mine financing should not be subject to the whims of Government agencies. The resolutions oppose the Government's policy of leasing mineral land, and the excess profits and capital stock taxes. They ask that war-time military reservations be returned to the public domain where possible, and ask reconsideration of Alaskan Indian land laws affecting mining, and that gold miners be reimbursed by the Government for losses due to the Government's order closing gold operations. One government policy was endorsed, to-wit: the work of the U. S. Geological Survey during the war. Construction of a branch of the Alaskan Highway, west of the Rocky Mountains, was urged. The resolutions urge that new exploration work be encouraged to offset the exhaustion of known mineral deposits.

Senator Pat McCarran, of Nevada, chief speaker of the convention, urged removal of restrictions on the sale and use of silver which he said would increase prices to the producers. "Our production is falling short of supplying industrial need. Silver senators have no objection to the Treasury selling silver to industry, if silver is remonetized and given a fixed and staple price."

Wray D. Farmin, director in the Day mining corporations in the Coeur d'Alenes, has been elected president of the Northwest Mining Association; Leo J. Hoban, Hecla Mining Co., vice president, and Mrs. Margaret Orr, office manager.

## Minerals Held by MRC on Oct. 31, 1945, Listed

The Civilian Production Administration last week announced the amounts of strategic metals and minerals held on Oct. 31, 1945, by the Office of Metals Reserve, Reconstruction Finance Corporation. The figures cover materials stored in the United States and Canada. In some items, as zinc, copper, and tin, additional material may be stored in various centers as metal or in ore and concentrates. Two lists were issued as follows:

List 1

| | Stocks, Oct. 31, 1945 |
|---|---|
| Antimony, metal, ton | 2,089 |
| Antimony, oxide, ton | 66 |
| Antimony, ore, ton | 8,159 |
| Beryl ore, ton | 4,768 |
| Cadmium, lb. | 1,225,971 |
| Chromite, long ton: | |
| High grade (Russian) | 236,297 |
| Other, various grades | 159,875 |
| Low grade domestic | 111,861 |
| Refractory grade | 236,855 |
| Chemical grade | 51,596 |
| Cobalt, lb. | 3,295,421 |
| Copper, refined, ton | 498,406 |
| Diamonds, carets | 3,529,883 |
| Fluorspar, metallurgical, ton | 177,557 |
| Acid spar, ton | 22,007 |
| Graphite, ton | 2,477 |
| Lead, refined, ton | 86 242 |
| Magnesium, secondary ingot, lb. | 2,215,562 |
| Manganese ore, long ton | 939,543 |
| Mercury, flasks | 63,638 |
| Mica, lb. | 11,024,797 |

| | |
|---|---|
| Molybdenum, lb. | 4,746,202 |
| Nickel, lb. | 36,620,421 |
| Platinum, troy oz. | 55,166 |
| Quartz crystals, lb. | 993,019 |
| Tantalite, lb. | 420,861 |
| Tin, pig, long ton | 21,163 |
| Tungsten, lb. | 22,012,743 |
| Vanadium, lb. | 1,805,568 |
| Zinc, slab, ton: Grade A | 167,437 |
| Grade B | 79,884 |

**List 2**

| | Stocks, Oct. 31, 1945 |
|---|---|
| Aluminum, ingot, lb.: | |
| Primary | 385,140,355 |
| Secondary | 6,223,108 |
| Asbestos, ton | 18,250 |
| Bauxite, long ton | 2,712,688 |
| Bismuth, lb. | 782,514 |
| Celestite, ton | 9,210 |
| Columbium, lb. | 33,991 |
| Corundum, grain, ton | 1,443 |
| Cryolite, refined basis, ton | 25,512 |
| Indian kyanite, ton | 3,515 |
| Iridium, troy oz. | 3,147 |
| Osmium, troy oz. | 185 |
| Rhodium, troy oz. | 161 |
| Rutile, ton | 3,569 |
| Talc, steatite, ton | 6,541 |
| Talc, block, ton | 120 |
| Baddeleyite, ton | 15,829 |
| Zircon, ton | 2,581 |
| Arsenic, ton | 4,225 |
| Manganese, electrolytic, lb. | 400,000 |
| Calcite, optical, lb. | 520 |
| Silver, troy oz. | 7,446,209 |
| Spodumene, ton | 1,571 |

RFC stocks as reported are all of specification grade—i.e., of high enough quality to meet the specifications of the military services, with but five exceptions. These are manganese, tungsten, vanadium, cobalt, and chromite.

Of the six grades of manganese, there are 250,000 tons in the Government stockpile which are in the lowest two. This amounts to approximately 25 percent of the entire quantity RFC has on hand. Actually, these poorer grades can be used, although they are low in manganese, being down to 40 or 42 percent. Some is off-grade because it is high in iron and high in silica.

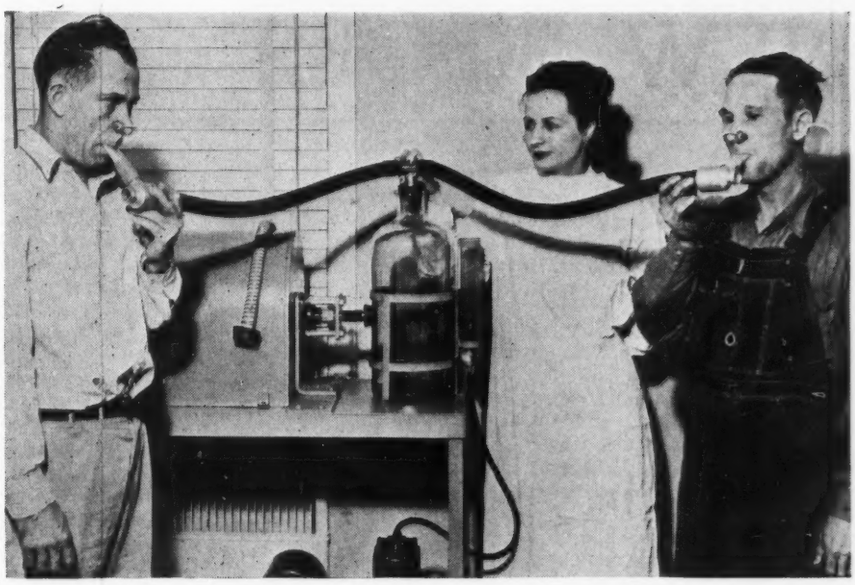
The tungsten, which is off-grade, is all being processed and brought up to standard specifications.

The stockpile of vanadium is held in various places, and that in two of the stocks amounting to approximately 450,000 lb. contained metal, or about 25 percent of the total, is off-grade. RFC indicates that this probably will be held in the stockpile as is.

The bulk of cobalt ore is of Canadian origin, containing 10 to 11 percent cobalt. This can be used on a modest scale to produce oxide. However, because it is high in arsenic it is difficult to treat. Actually, the domestic mining industry has little interest in cobalt, as so little is produced in the United States.

About a third of the stockpile is cobalt ore which is high in gold. This came from French Africa and it possibly may be returned to the French.

Another portion of the cobalt ore was produced in Missouri. This is a complicated nickel-cobalt concentrate which so far appears to have defied the efforts of the best research men who have been searching for a method of treatment. Research on treating this concentrate is continuing. This ore was produced by the St. Louis Smelting & Refining Co., a subsidiary of National Lead.



**MINERS of the St. Louis Smelting & Refining Co. receiving treatment by the ball-mill method at the Picher hospital under the supervision of Miss Mary Williams, who recently accompanied Dr. J. W. G. Hannon, U. S. director of McIntyre Research, Ltd., to the Tri-State district, where mining companies are sponsoring an aluminum therapy program. The ball mill at left grinds aluminum pellets, generating very fine powder, which is inhaled. Dr. M. A. Connell, of Picher, is in charge of the medical control phase. Photo by Orrick Sparlin.**

The low-grade domestic chromite, which is listed separately in the Government figures, was obtained chiefly from Montana and Oregon, with which the mining industry is already familiar.

The Government figures on zinc do not include the stocks of zinc concentrates, which for the purpose of the tabulation were considered as being in process. It is estimated by the RFC that the zinc content of the zinc concentrates on hand on Oct. 31, 1945, the date the inventory was taken, amounted to 292,689 tons, assuming an 83 percent recovery of metal. In addition, the ores and concentrates in the smelters have a zinc content estimated at 59,437 tons. The total amount of zinc in the Government stockpile is the total of these two figures and the figures on slab zinc shown.

Government buying of mica ended Nov. 1, and until imports by private operators are sufficient to meet the demands of industry the Government will sell some of its stocks of low-grade material. It is the policy of the Government, however, to retain as much mica as possible for the stockpile. The figures indicate that the balance between the types that will be turned over to the stockpile will be good. In the stocks there were 951,514 lb. of fair stained and 2,123,929 lb. of good stained, the best two grades. It is understood the RFC is revising its prices upward to be sure that the users of mica will have no incentive to buy from the RFC and deplete the supplies now on hand. The officials believe that although a considerable quantity will have to be sold by the Government during the first quarter of 1946, domestic industry and imports will be able to meet all requirements after that time.

The Metals Reserve holdings are the only ones that are being made public at this time. Army and Navy stocks, Treasury stocks, and any other Government accumulations still come under the head of restricted information. No official information is available on when figures of other than Metals Reserve stocks will be made public.

The figures of the Metals Reserve stockpiles are for the metal content of ores, concentrates, and metals. A rule of thumb which can be used in interpreting the figures is that the custom of the industry is closely followed as, in the case of vanadium, the metal is ferrovanadium or some other alloy.

## AMC Board Recommends Favorable Mining Policies

The Board of Governors, Western Division, American Mining Congress, which met in Salt Lake City on Nov. 25, 26, and 27, went on record against the principle of compulsory arbitration, stating that in collective bargaining the sole function of Government "is to act as an impartial conciliator and to hold employers and employees alike responsible before the law for their

(*Continued on page* 101)

# NEW BOOKS

**ATOMIC ENERGY IN WAR AND PEACE.** By Gessner G. Hawley and Sigmund W. Leifson. Reinhold Publishing Corporation, New York. Pp. 211. Price $2.50.

Since the first bombs were dropped at Hiroshima and Nagasaki, or, better, since the appearance of the official Smyth report on atomic energy, many a writer and publisher undoubtedly has felt impelled to turn out a book on this fascinating subject. Messrs. Hawley and Leifson have yielded to the strong pull of this attraction. In the preface they say that their book is hastily written and they call it a "quickie." Nevertheless, they have done an excellent job in expounding a difficult subject in a pleasantly popular, but not too popular, vein. They have divided the text into short sections (instead of chapters)—96 of them comprising the 196 pages that precede the appendix—each of them simply written. This, coupled with an easy style and with the publisher's use of 12-pt. type (there are 72 points to an inch) in a line of type only 3¼ in. wide, facilitates reading.

In the first 33 sections, totaling 49 pages, the authors take you through those elements of physics and chemistry that are necessary before one should attempt to look inside the atom to find how it is made and what makes one element different from another. The next 25 sections, totaling 50-odd pages, contain a popular outline of nuclear physics, by which time the reader is ready, or should be, to focus his attention on uranium, its fission, and the production and capture of neutrons. The rest of the book, mainly on the bomb project, suggests the Smyth report, which has been properly credited by the authors. An appendix contains the roll of honor of some 200 individuals, 20 manufacturing companies, 24 universities and research organizations, as well as the Army and Navy and the Bureau of Standards, that were engaged on the project in this country.

**GERMAN (OR GERMAN-CONTROLLED) PLANTS.** Three reports, Nos. 313, 348, and 351. Released by War and Navy Departments to Office of Publication Board, Department of Commerce, Washington, D. C.

Report 313, prepared by E. H. Wagner, W. Ivory, and J. G. Holmes, deals with two French firms in Paris that were producing tungsten carbide. These were: Filiere Union and Soc. de Lorraine de Charbon pour l'Electricite. The plants were visited in November 1944. A certain amount of information was collected about the German tungsten carbide industry. Pp. 9. Price 25c.

Report 348, by B. W. Mott, covers a visit made to the plant of Aluminum Woerwerke, Erftwerke, Gravenbroich, which had been engaged in electrolytic production of aluminum from bauxite; rolling of antilocation strip from aluminum so produced; and recovery of aluminum from swarf and dross and from scrap aircraft. Pp. 8.

Report 351, by Harrison M. Brightman, deals with the plant of Geb. Bohler A. G. Buderich, which has ranked high in German production of quality steels, tool steels and forgings.

The Board, in disseminating the information contained in these reports, hopes that it will be of direct benefit to U. S. science and industry.

**AMERICAN MACHINISTS' HANDBOOK AND DICTIONARY OF SHOP TERMS.** Eighth edition. By Fred H. Colvin and Frank A. Stanley. McGraw-Hill Book Co., New York. Pp. 1546. Price $5.

The first edition of this well-known reference book of machine-shop and drawing-room data and methods appeared in 1908, since when a total of 509,000 copies have been issued to date—a strong testimony as to the usefulness of the handbook. The new edition has been considerably expanded. New tables and 38 pages of material have been added to the section on milling (machine) practice. Included also is much new material on bevel and other gearing. Throughout the book new data have been added on a variety of subjects.

**EFFICIENT USE OF FUEL.** American edition of British text prepared under the direction of Education Subcommittee of the Fuel Efficiency Committee of the Ministry of Fuel and Power, with a foreword by Dr. John C. Olsen, Polytechnic Institute, Brooklyn. Published by Chemical Publishing Co., Inc., Brooklyn, N. Y. Pp. 807. Price $8.50.

A large and representative group of British technologists have prepared and edited the 34 chapters composing this volume. Topics dealt with include: Industrial fuels; storage of coal; combustion and gasification—chemical principles and heating effects; combustion in practice; utilization of steam; heat transmission; flow of fluids; measurement of solid fuel, steam, water gas and air; stoking and boiler operations; pulverized fuel; steam boilers and auxiliary plant; feed water purification; boiler inefficiency and testing; gas producers; furnaces, including electric furnaces and waste-heat boilers; refractory and insulating materials; steam for industrial purposes; central heating; drying; thermostatic control in steam and hot water practice; auxiliary plant for efficient use of gas; oil and its utilization; graphical heat balances; instruments; sampling solid fuels, also gases; solid fuel analysis; selecting fuel for industrial purposes.

In addition to the foregoing topics two appendices deal respectively with a survey of British coals and with the subject of entropy. The third appendix includes seven pages of steam tables.

## PUBLICATIONS RECEIVED

"Powder Blast Mining in Conjunction with Long-Hole Blasting," By Howard M. Fowler. Bulletin, Sept. 1945, Missouri School of Mines and Metallurgy, Rolla, Mo. Pp. 12.

"Technique for Making Torsion Balance Surveys of Inundated Areas," by K. F. Hasselmann. Bulletin, June, 1945, Missouri School of Mines and Metallurgy, Rolla, Mo. Pp. 32.

"Nickel-Copper Prospect Near Spirit Mountain, Copper River region, Alaska." Bull. 943-C, U. S. Geological Survey, Washington, D. C., Pp. 45-56.

"Artesian Water in Southeastern Georgia—Well Records." By M. A. Warren. Georgia Geological Survey, Atlanta, Ga. Pp. 83.

Transactions of Canadian Institute of Mining and Metallurgy and of the Mining Society of Nova Scotia, 1944. Vol. 47, Pp. 531.

"Canadian Mineral Industry in 1944." Reviews by staff of Bureau of Mines, Bull. No. 815, Ottawa, 1945.

"Feldspar and Quartz Mining Industry in Canada, 1944," including data relating to nepheline-syenite. Dominion Bureau of Statistics, Ottawa, Pp. 9.

"Mining Industry of Province of Quebec in 1943." Department of Mines, Quebec, P.Q. Pp. 157.

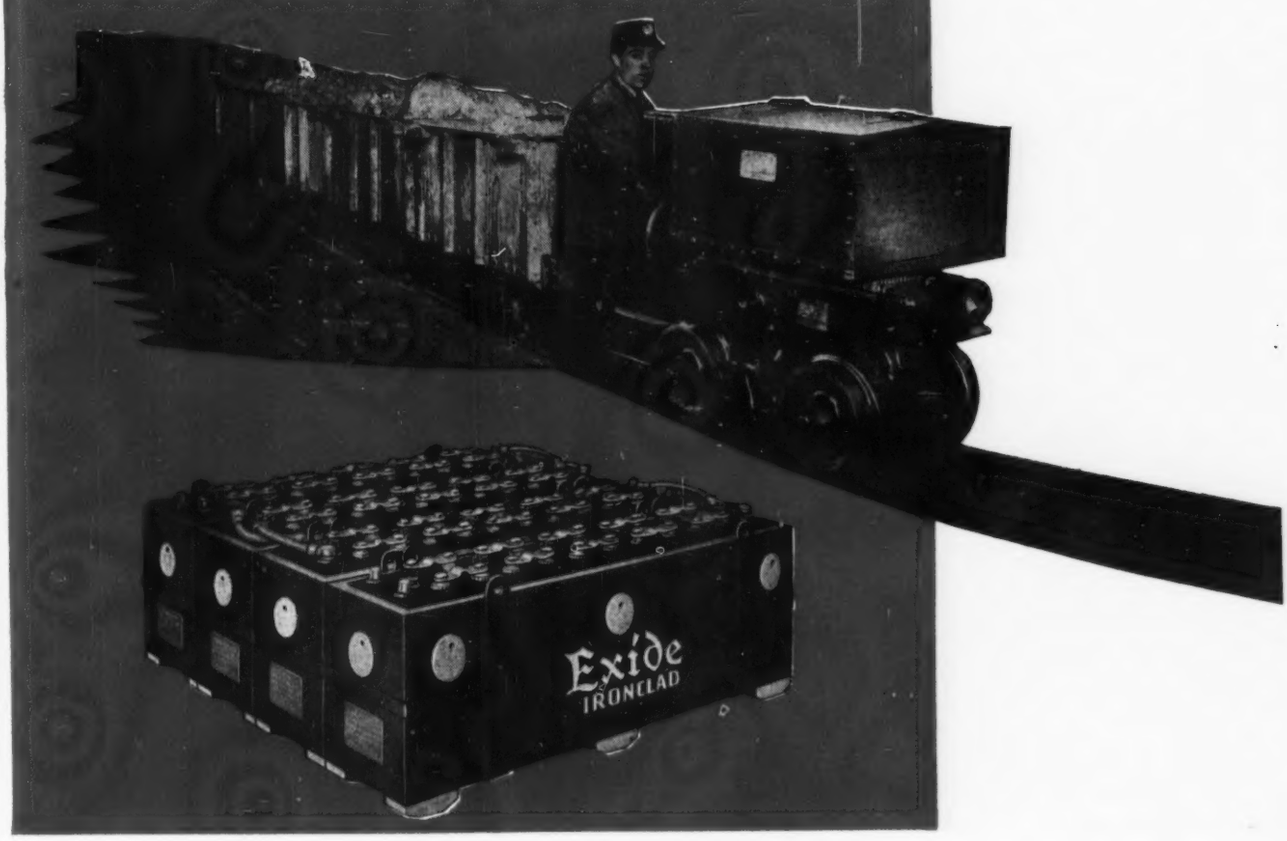
"Moisie Area, Saguenay County." Geological Report 21, Pp. 15 plus map; also Geological Report 22, "Matamec Lake Map-Area, Saguenay County," Pp. 29 plus map.

Chamber of Mines of Rhodesia, Inc. Annual report, 1944. Bulawayo, Rhodesia, Pp. 50 plus insert.

"Water Boring in Uganda, 1920-1940." Geological Survey of Uganda, Entebbe, Uganda. Pp. 32. Price 2½s.; also "Small Reservoirs in Uganda." Pp. 44. Price 2½s.

# POWER

## EXIDE-IRONCLAD POWER ASSURES LOWER HAULAGE COSTS PER TON

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# PERSONAL NEWS

**Dr. Ben H. Parker,** vice president of Frontier Refining Co., has been made president of the Colorado School of Mines, succeeding **Dr. M. F. Coolbaugh,** resigned. Dr. Parker is an alumnus of the School.

**T. H. O'Brien,** vice president and general manager of Inspiration Consolidated Copper Co., relinquished his duties as general manager of the Inspiration property, but will remain in an advisory capacity with the title of vice president, after Jan. 1, 1946. Mr. O'Brien came to Inspiration as general manager in 1920 and was formerly employed by the Phelps Dodge Corporation. He will be succeeded as general manager by **P. D. I. Honeyman,** who will be assisted by **H. Carroll Weed** as general superintendent of Inspiration.

**Eugene G. Grace,** president of Bethlehem Steel Corporation since 1913, has been elected chairman of the board of directors of the corporation. He is succeeded in the office of president by **Arther B. Homer,** vice president in charge of Bethlehem's shipbuilding division. Mr. Grace continues as chief executive officer.

**H. B. Burwell** has been appointed State Geologist of Tennessee and Director of the Division of Geology at Nashville. He took office Sept. 1 last. Mr. Burwell, who is 38 years old, did his undergraduate and graduate work at Vanderbilt University. Prior to his new appointment he was on the staff of the Exploration Department of Shell Oil Co., Inc., and has done work in the Mississippi Valley and Mid-Continent areas.

**Dr. Marcellus H. Stow,** chief of the Mining Branch of the Civilian Production Administration; **F. W. Christiansen,** chief of the Metal Mining Section; **Fred Chase,** chief of the Non-Metallics Section; and **B. R. Ewing,** of the Mining Machinery Section, retired from Government service on Dec. 31. Remaining after Jan. 1 were **H. B. Wickey,** chief of the Coal Section, who will handle mining priority matters, and **Harold Montag,** chief of the Mining Machinery Section.

**Clarence E. Abbott,** vice president of the Tennessee Coal, Iron & Railway Co., retired on Dec. 31, 1945. Mr. Abbott has spent 43 years with subsidiaries of the U. S. Steel Corporation. He also relinquishes the position of vice president and director of Universal Exploration Co., a U. S. Steel subsidiary. Mr. Abbott was born at Kendall, Wis., and was graduated with a B. S. degree in engineering in 1901. He is a member of the A. I. M. E. and several other professional organizations.

**H. A. Rossell** has resigned as manager of the feldspar grinding plant of United Feldspar & Minerals Corporation at West Paris, Me. He is succeeded by **H. W. Childs,** formerly chemist.

**Myron L. Trilsch,** deputy director of the Tin, Lead, Zinc Branch of CPA, has resigned from the bureau to join the sales staff of the American Metal Co.

**John Croston,** former assistant director of the War Production Board's Tin-Lead-Zinc Division and presently with the Civilian Production Administration, has been loaned to the Reconstruction Finance Corporation to undertake a survey of the tin and antimony situation in the Far East. He

JOHN CROSTON

left for the Netherlands East Indies early in December to cover the producing areas before going to Malaya, where he will join two other government representatives covering that country.

**Major Francis C. Wojtanowicz** has been appointed assistant engineer for International Minerals & Chemical Corporation, Chicago. He was formerly engineer of the Tennessee Phosphate Division of the company.

**Philip D. Wilson,** vice president for Metals and Minerals, and **Samuel W. Anderson,** formerly vice chairman, of WPB, specializing in metals, have joined Lehman Brothers, New York banking firm. Mr. Anderson was responsible for the construction of aluminum and magnesium plants erected by the Government.

**A. A. McLeod** has been appointed assistant general manager of Big Bell Mines, Ltd., Big Bell, Western Australia.

**Keith F. Finlay** has established a general mining and engineering service, with headquarters in the Oviatt Building, 617 South Olive St., Los Angeles 14, Calif.

**L. A. Crozier,** assistant manager of Wattle Gully Gold Mines, N. L., Chewton, Victoria, has accepted the position of mine superintendent of Patiño Mines and Enterprises Consolidated, Inc., La Paz, Bolivia.

**R. I. Rankin** has resigned as general manager of Eldorado Tennant Creek Ltd., Northern Territory, Australia, to accept the position of assistant manager at the Wattle Gully Gold Mines, N. L., Chewton, Victoria.

**R. J. Falconer,** who was for many years general manager of Cooks Pioneer Gold & Tin Mining Co., N. L., at Eldorado, Victoria, has been appointed general manager of Harrietville (Tronoh), Ltd., at Beechworth, in the same State.

**Simon Strauss,** metal economist, deputy director of the Office of Metals Reserve, and, before entering Government service, on the staff of *Engineering and Mining Journal* and with Standard Statistics, on Jan. 1 joined the sales staff of the American Smelting & Refining Co.

**E. A. Behr,** assistant manager of the sales department of American Smelting & Refining Co., in charge of lead sales, retired on Jan. 1 after 38 years of service with the company. He has been succeeded by **William B. Clancy,** who has been associated with the lead section for a number of years.

**Roy B. Earling,** vice president and general manager of the United States Smelting, Refining & Mining Co., in charge of Alaskan operations, has gone to the States. He will spend the winter months at the head office in Boston, returning to Alaska in March.

**E. H. Read** recently retired as manager in South Africa for the Anglo-French Exploration Co., Ltd., a position which he had filled since 1913. He has just completed 50 years' service with the company. **A. W. Stewart,** who joined the staff in 1933, succeeds him.

**Norman Weiss** recently resigned as mill superintendent with the American Smelting & Refining Co. in Mexico, and is now with Dow Chemical Co. in San Francisco.

**R. H. Zeglin,** general manager of Reynolds Mining Corporation, Little Rock, Ark., has been made vice president of the same company.

**C. Lester Richards,** formerly chief mining engineer for Reynolds Mining Corporation at Little Rock, Ark., is now with International Minerals & Chemical Corporation as mining engineer for the

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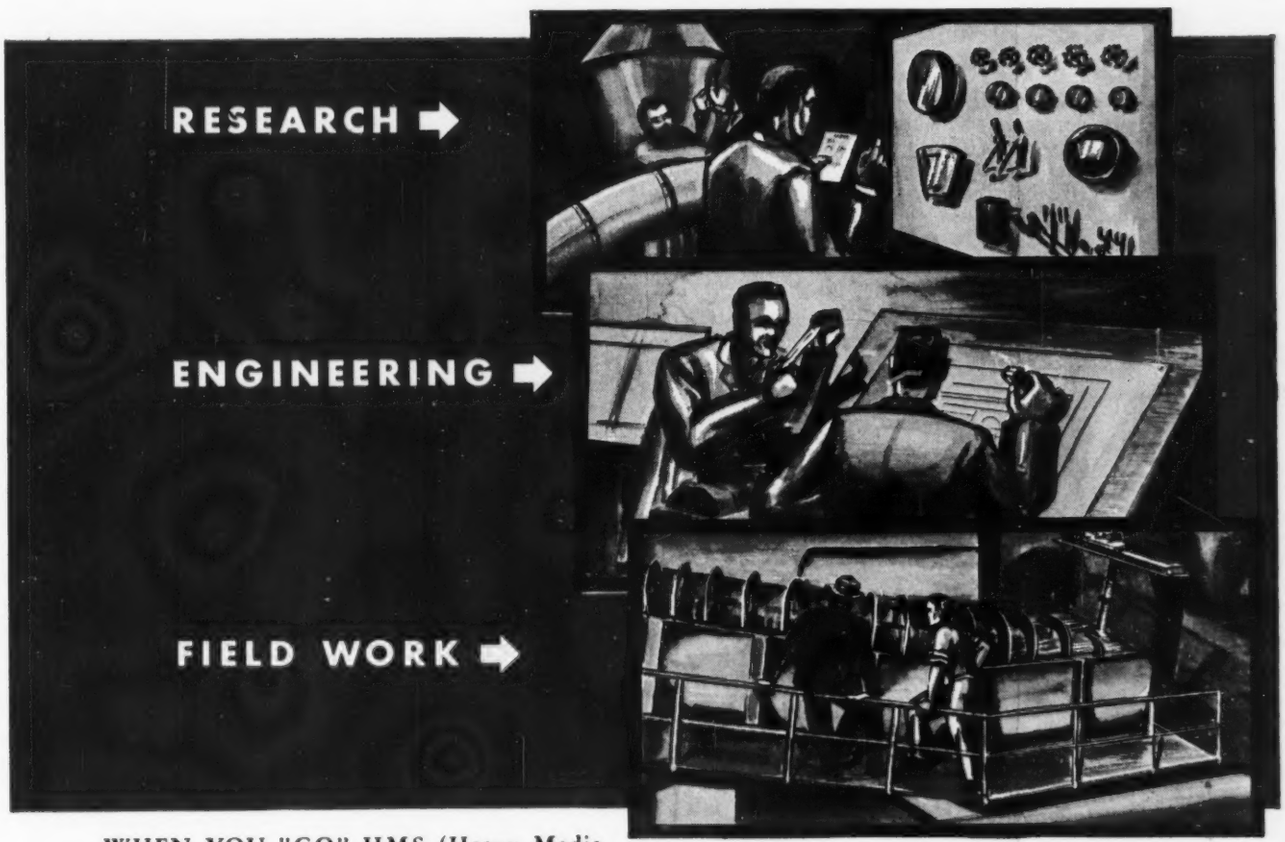
- REDUCED OVERHEAD
- GREATER PRODUCTION
- MORE PROFITS




WHEN YOU "GO" HMS (Heavy Media Separation) the advantage of Western Machinery's vast store of equipment knowledge will help to produce more operating profits for your new plant.

Wemco has equipped more HMS plants than any other manufacturer in the world. Because of this experience Wemco has built a fund of engineering and operating data on this new process. This data is incorporated in product improvements to assure operators that they will achieve the utmost in plant profits.

***NEW CATALOG — A new catalog on HMS equipment giving capacities and operating data is in preparation now. Write to Wemco, 760 Folsom St., San Francisco, Dept. 5 and a copy will be sent when published.***

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1435

Phosphate Division, with headquarters at 20 North Wacker Drive, Chicago.

**Felix N. Williams,** formerly general manager of the Monsanto Chemical Co. at Monsanto, Tenn., where the company produces elemental phosphorus in electric furnaces from phosphate rock, is now vice president of the company and manager of the Plastics Division at Springfield, Mass.

**Robert D. Ferron,** formerly in Bolivia as manager of the Bolivian Internation Mining Corporation at Huanuni, is now in New York.

**Arch Little** has left the Civilian Production Administration in Washington to take a European assignment in Vienna for the military government. He is expected to be out of this country for a year, by which time the State Department will have trained its personnel to take over in the various foreign countries.

**Prof. Carlton D. Hulin,** who has been serving as consulting mining geologist with the Foreign Economic Administration of the United States, has resigned from that organization and has returned to the University of California. While with the Foreign Economic Administration Dr. Hulin visited India and China on a special mission involving investigation of resources of strategic metals and minerals. In addition to university work he plans to resume private consulting practice.

**Alfred E. Walker,** chief geologist of the M. A. Hanna Co., of Cleveland, Ohio, has gone to South America to study ore deposits in Brazil.

**William Wraith,** associated with Anaconda Copper Mining Co. since 1897 and president and director of Andes Copper Mining Co., Chile Copper Co. and Greene Cananea Copper Co., Anaconda subsidiaries, retired from active business on Jan. 1.

**George E. Cole,** Director of Mines, Manitoba Department of Mines and Natural Resources, retired Nov. 30, 1945. Mr. Cole had been director since 1930 and prior to going to Manitoba was associated for the many years with the Department of Mines and the mining industry in Ontario. One of the many honors bestowed upon him by technical and professional institutes was that of election to the presidency of the Canadian Institute of Min- and Metallurgy.

**Mancil J. Gobert,** employed at West Rand Consolidated Mines, South Africa, since 1937, in various capacities, including underground manager, has been appointed Inspector of Mines for the Manitoba Department of Mines and Natural Resources.

**Frank S. Crawford,** engineer in charge of the U. S. Bureau of Mines safety station in Phoenix, Ariz., has been transferred to the College Park station in Maryland. Mr. Crawford will be succeeded by **Allen D. Look,** formerly of Albany, N. Y., station.

**John B. Campbell** has joined the staff of the Peru Mining Co. of Deming, N. M., in the capacity of chief chemist. Campbell was formerly chief chemist for the Shattuck Denn Mining Corporation, of Bisbee, Ariz.

**Jack Stonestreet,** recently four years in the Marine Corps, has been appointed to the staff of the Missouri Geological Survey at Rolla. Mr. Stonestreet is a former student of Drury College, Springfield, Mo.

**A. E. Weissenborn,** who has been regional geologist for the U. S. Geological Survey at Rolla, Mo., has been transferred to the northwest regional office of the Survey at Spokane, Wash. Mr. Weissenborn will be in charge of his new station. The Rolla office, according to a report, will be closed.

**Lloyd C. White,** consulting mining engineer, has returned to his headquarters at 1005 Oxford St., Berkeley, Calif., from a protracted professional trip through the Middle West.

**Major Norman Cleaveland,** mining engineer and dredge operator, has reopened his offices in the Russ Building, San Francisco, Calif., following his retirement from active duty with the Army Air Forces.

**Harold M. Wright,** consulting metallurgist, has been appointed to the staff of the University of British Columbia as part-time lecturer in the Department of Mining and Metallurgy. For the remainder of the term he will lecture on mineral dressing, taking the place of **Prof. George A. Gillies,** retired.

## OBITUARIES

**Dr. Stanley A. Trengove,** editor of *Mining Congress Journal,* died in Washington, D. C., on Dec. 28, at the age of 47.

**Frank S. Warzeski,** vice president of Linde Air Products Co., long associated with Union Carbide & Carbon Corporation in an executive capacity, and former chairman of the engineering committee supervising the helium plant at Fort Worth, Tex., died at Montclair, N. J., on Dec. 21 last, at the age of 61.

**F. E. Haag,** president of United Feldspar & Minerals Corporation, died on Sept. 30, 1945, and has been succeeded by **R. F. Sherwood,** formerly executive vice president.

**Clarence Victor Hopkins,** long a consulting mining engineer of the West and formerly chief engineer for United Verde mine, at Jerome, Ariz., died at Los Angeles on Dec. 25 at the age of 65.

**George S. Young,** mining engineer, died in Oakland, Calif., on Nov. 22, 1945, aged 62.

**R. G. Hall,** California consulting metallurgist, died Nov. 24 last, from injuries suffered in an automobile accident at Hollister, Calif. Mr. Hall had held responsible positions in Colorado, Missouri and Burma mining enterprises. He was 71 years old.

**John Campbell** died in Bisbee, Ariz., on Oct. 7 last. **Mr. Campbell** came to Arizona in 1884 and had been active in mining in the State, until he was appointed postmaster of Bisbee eleven years ago.

**George S. Jones,** 65, died in Ajo, Ariz., on Oct. 1, 1945. Mr. Jones had been employed by the Phelps Dodge Corporation for the past 21 years in Douglas and Ajo.

**Adelbert E. Stocking,** of De Soto, Mo., well-known mining man of Missouri, died suddenly on Nov. 6, 1945. Mr. Stocking was with the National Pigment & Chemical Co. for many years and served also as an independent buyer of barite and as a partner in the De Soto Mining Co. He took an active interest in civic affairs and was a member of the A.I.M.E.

**William Doidge,** 68, native of England and former secretary-treasurer of New Quincy Mining Co., died Nov. 12 at his home in Salt Lake City.

**Ezra Phillip Thompson,** 48, who had been vice president of Cardiff Mining Co., vice president, Kennebec Mining Co., and secretary, Ezra Thompson Investment Co., died at Salt Lake City Nov. 15, 1945.

**Stanley H. Zimmerman,** 55, plant manager of the Post Products Division of General Foods Corporation, and since 1939 a member of the Michigan College of Mining and Technology Board of Control, died in Battle Creek Nov. 27. After his graduation from the then Michigan College of Mines in 1915, he worked as a mining engineer in South Africa, South American, and the United States.

**Allan Cameron,** retired, for many years underground captain of the conglomerate branch of Calumet & Hecla, died in St. Petersburg, Fla., Dec. 9.

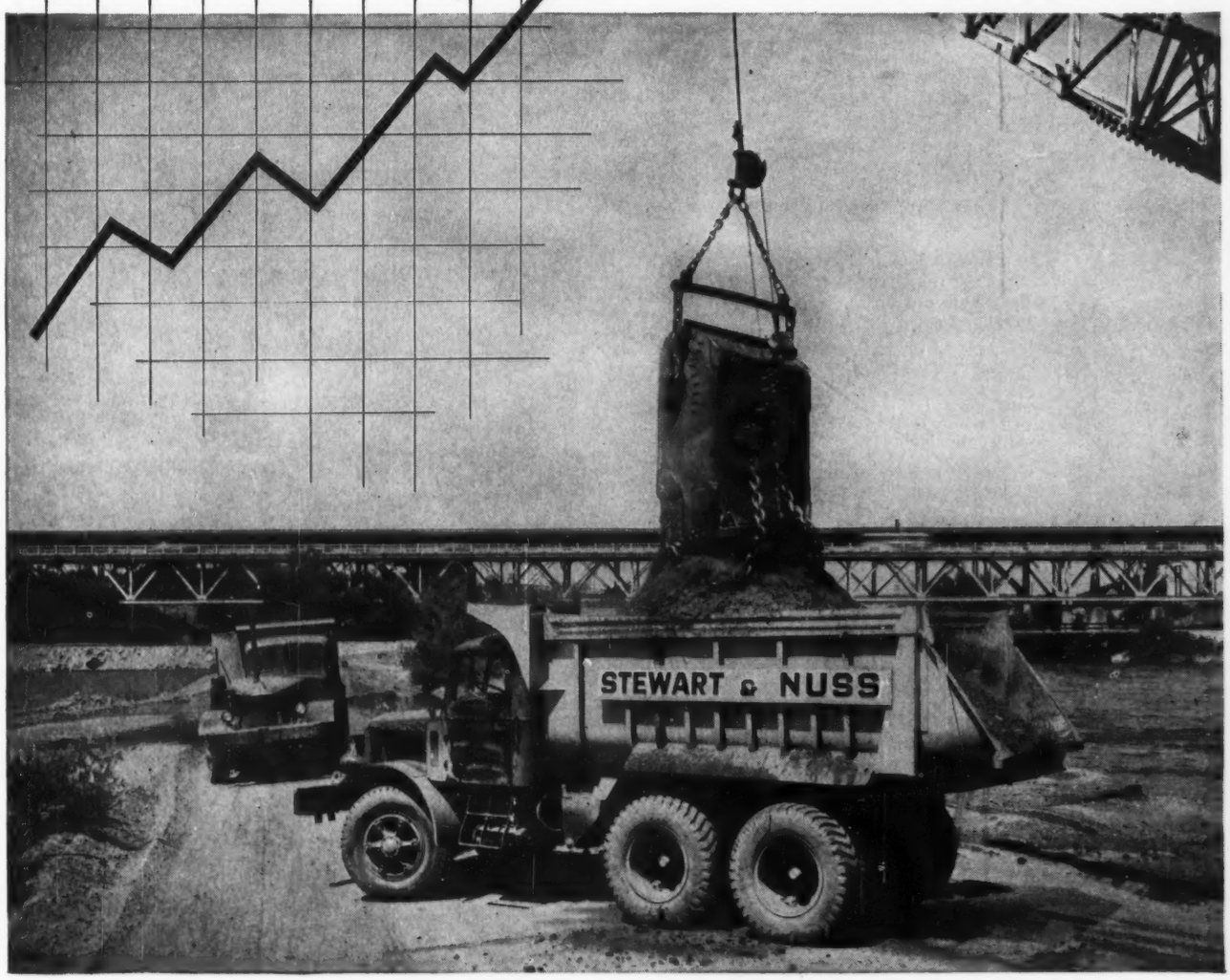
**Dr. Roy Jay Holden,** 75, geologist, who had been a member of the faculty of Virginia Polytechnic Institute for 40 years, died on Dec. 16 at Blacksburg, Va.

**Edward H. Clark,** president and chairman of the board of Homestake Mining Co., died in San Francisco on Dec. 16 at the age of 81.

**William Arthur Butchart,** of Denver, an inventor and builder of mining machinery, died in that city on Nov. 25 at the age of 78.

# Stepped-up production ...Thanks to Mack!

WITH so many orders to build air fields and defense highways, Stewart & Nuss, prominent California contractors, were faced with a supply problem. Limited area of operation restricted the number of trucks carrying paving material, thus slowed down production. How was this "bottleneck" broken? By the purchase of two diesel-powered, extra-large-capacity Macks! Operating full time, with their 15-ton loads, these Macks enabled the contractors to more than meet production demands. And so satisfied were Stewart & Nuss, that they are already planning additional purchases of Macks! . . . There is always a Mack to meet any particular problem!




*Mack Trucks, Inc., Empire State Building, New York 1, N. Y. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts.*

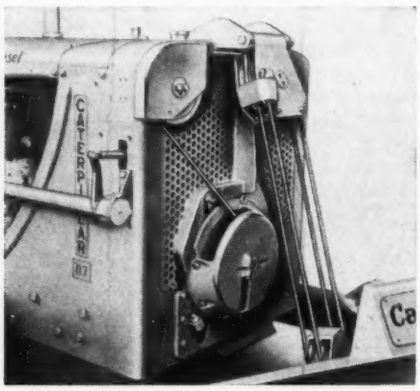
**Mack**
TRUCKS
FOR EVERY PURPOSE

**Performance Counts**

# EQUIPMENT NEWS

## Tractor Cable Control

Multiple disk-type clutches are a part of the new single-drum front-mounted cable controls recently announced by Caterpillar Tractor Co.,



Peoria, Ill. Smoother operation of bulldozers is said to result from use of this control, which is supplied for Caterpillar tractors D8, D7, and D6. Several features of construction and installation are said to contribute to easy operation and maintenance.

## Improved Paving Breaker

An improved version of its self-contained, gasoline-driven, portable paving breaker is announced by Syntron Co., 510 Lexington Ave., Homer City, Pa. The nose end of the machine has been redesigned to use a spring tool-retaining clip, which allows easier changing of tools and adds to the life of the equipment.

## Rubber Filtering Media

Rubber filtering media made of Multipore, a porous rubber sheeting made by U. S. Rubber Co., Rockefeller Center, New York, N. Y., will again be available for civilian use in January. Possessing as many as 6,400 holes per square inch, the sheeting is said to be highly resistant to corrosion and wear. It has been tested in chemical, mining, food packing, and other industries.

## Concentrating Tables

Ore-concentration tables for use in laboratories, as built at present, have six defects that can be corrected, according to a report (R.I. 3851) issued recently by the U. S. Bureau of Mines, Washington 25, D. C. Authors of the report, Will H. Coghill, G. T. Adams, and H. S. Hardman, list the defects encountered and corrected as: poor position of water launder; jamming of draw bar when deck is tilted; build-up of dry ore on lower concentrate corner; flimsy substructure; too short a stroke for correlation with plant work; poor tilting mechanism. A full explanation of changes made is included in the report.

## Mine Fire Car

Mine fire fighting cars of a new design are now offered by Dugas Division of Ansul Chemical Co., Marinette, Wis. Using the chassis of a standard mine car, the Ansul car is equipped with three 300-lb. tanks of Dugas dry chemical, which operate through one 50-ft. and two 100-ft. hoses. The car also carries 100 gal. of water in a tank fitted with a 100-ft. hose. Hand extinguishers and safety equipment are provided.

## Oxygen-Generating Mask

By generating its own oxygen, a new breathing apparatus announced by Mine Safety Appliances Co., Pittsburgh, Pa., gives its wearer one hour's protection in unbreathable air. The units weighs 13½ lb. and uses no cylinders or high pressure valves.

Perfected shortly before Pearl Harbor, the mask has been used throughout the war by the Armed Forces, particularly by the Navy in damage control work on shipboard. The mask contains a replaceable canister of chemicals that generate oxygen when the wearer's breath enters it. Carbon dioxide is removed from the exhaled breath, oxygen is restored to it, and the air is led back into the breathing bag reservoir. Before the canister is exhausted, an alarm bell rings as a warning. Bulletin BM-8 describes the new mask.

## Welding Aid

Designed to aid in instantaneously creating and thereafter maintaining a metallic welding arc, where low currents and small-diameter electrodes are in use, a new compound, known as Strike-Easy, was recently announced by the Electric Welding Division of General Electric Co., Schenectady, N. Y. The product comes in paste form and is easily applied.

## Magnetic Contactor

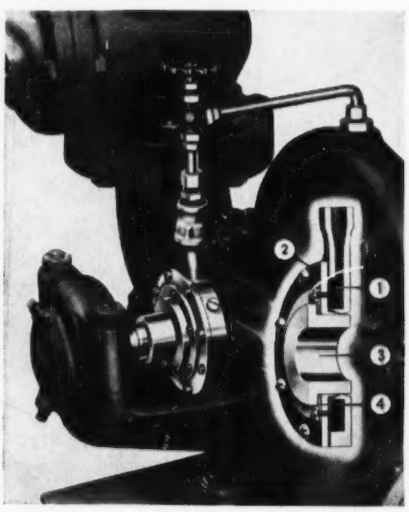
For machine-tool control, marine and mine use, and similar severe duty applications in limited space, a new type M, d.c., single-pole magnetic contactor has been announced by Westinghouse Electric Corporation, Box 868, Pittsburgh 30, Pa. Use of the unit is restricted to coil voltages and interrupted circuit voltages of 250 volts or less; deep frame contactors handle up to 600 volts. The smaller contactor features compact design and easier installation.

## Blowout-Proof Tire

Because of its wire-corded construction, the new heavy-duty tire recently announced by Firestone Tire & Rubber Co., Akron, Ohio, is claimed to be practically blowout proof. Designed especially for use in logging, strip and open pit mining, and similar work, the new tire is now in its final laboratory and field tests. The use of fine metal wire cord in building the tire is said to provide cooler operation and to add about 25 percent to tire mileage.

## Pump Shaft Seal

A sealing device for horizontal centrifugal pumps is being manufactured by Jet Shaft Seals, Inc., 1452 S. San Pedro St., Los Angeles 15, Calif. By eliminating packing, the manufacturer



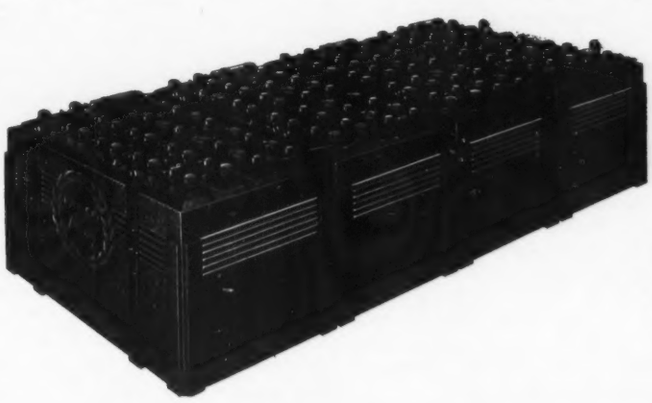

claims, the new seal accomplishes a number of operating and maintenance savings.

In operation, the seal draws liquid from a high-pressure point in the

**FOR SAFETY—**

# *Philco Equipped*

You go the limit in providing safe, flexible, low-cost power underground, when you specify Philco Shuttle Car Batteries. Shuttle cars powered by modern Philco Batteries require no auxiliary high voltage lines or exposed cables. Every unit has its own self-contained power plant as nearly automatic in its operation and maintenance as modern mechanical equipment can be. Write for specification data, and ask about the sensational new cost-saving Philco "Thirty" Mine Batteries, with 30% longer life. PHILCO CORPORATION, Storage Battery Division, Trenton 7, New Jersey.



**PHILCO**

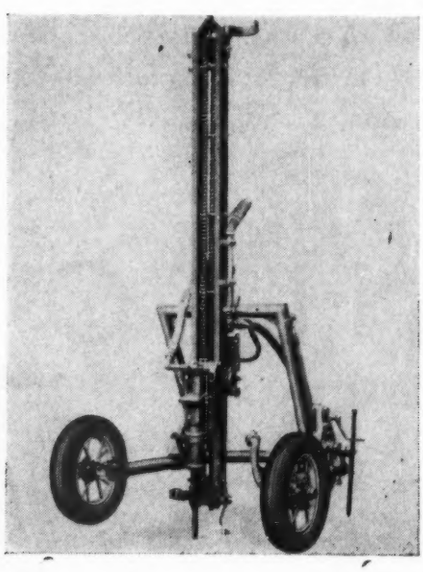
FOR 50 YEARS A LEADER IN MINE STORAGE BATTERY DEVELOPMENT

**ADJUSTING REAGENTS** in Allis-Chalmers Mfg. Co.'s new pilot plant for the basic industries, said to be the most extensive ever developed. Housed in a five-story building, the plant is equipped to test ore sample of from 500 lb. to 10 tons or more by standard or experimental concentrating and pyro-processing methods. Complete batch testing facilities are also available, as is equipment for testwork in fields other than metallurgy.

pump and jets it back into the low-pressure area with sufficient force to seal off internal pressures. As shown in the illustration, liquid flows through the box (1) past the orifice plate (2) and back into the pump. Shaft sleeve (3) turns with the shaft but is not in contact with the orifice plate, hence causes no wear. Diaphragm (4) seals the pump during a shutdown, but is not in contact with the shaft during operation. The seal is available for all pumps with one-inch, or larger, shafts.

## Heavy Wagon Drill

Improved performance as a result of several new design features is claimed for the new Blue Brute wagon drill recently announced by Worthington Pump & Machinery Corporation, Harrison, N. J. The new model, called the UMW-40, uses a heavy-duty drifter with a 4-in. cylinder.



Other features of the drill include: rifle-bar rotation; Worthington positive-acting and end-seating valves with circumferential seal; cylinder-controlled blowing device; one-piece chuck sleeve; drill steel-locking chuck; one air hose to backhead; heat-treated alloy steel major parts. Slow rotation parts are available, and the machine is easily convertible to wet drilling.

Controls of the feed mechanism are in easy reach of the operator. A standard roller chain with improved chain take-up is guided over large-size gear and idler sprockets. Power is supplied by a six-vane air motor. The sliding trunnion is adjustable in all drilling positions on the side instead of underneath the channel. An adjustable anchor prong on the side of the guide channel holds the feed assembly in alignment. The wagon mounting has a one-man lifting device that permits quick adjustment of the U-arm and the drilling unit. The U-arm may be moved on the frame for unusual drilling conditions, and the quick-locking rear wheels may be turned 90 deg. for drilling near a quarry face.

# INDUSTRIAL NOTES

**Syntron Co.**, Homer City, Pa., announces the appointment of **J. A. Armstrong** as district manager for Michigan, exclusive of Detroit.

**John D. Dale** has been elected president of the metal and chemical firms of **Charles Hardy, Inc.**, and its associated research organization, **Hardy Metallurgical Co.**, New York, N. Y.

**W. H. Hammond** has been promoted to the newly created post of vice president in charge of sales of **Gar Wood Industries, Inc.**, Detroit, Mich. **George D. Schaeffer** has been elected vice president in charge of engineering.

**Joseph S. Marx**, superintendent of the Carthage, Mo., plant of **Hercules Powder Co.**, will retire Jan. 1, 1946, after 45 years in the explosives industry.

**Texas Gulf Sulphur Co.**, New York, N. Y., announces the appointment of **A. Nelson Myers** to its sales staff with headquarters in New York.

**Allegheny Ludlum Steel Corporation** has acquired **Arnold Engineering Co.**, one of the country's largest manufacturers of permanent magnets.

**Lt. Com. Anthony Anable, U.S.N.R.**, has rejoined **The Dorr Co.**, New York, N. Y., as director of public relations and advertising. Commander Anable has been on leave from The Dorr Co. since shortly after Pearl Harbor. As navigating officer of an aircraft carrier, he participated in four major naval actions in the Mediterranean and the Southwest Pacific.

**E. W. LaPlant**, co-founder of **La Plant-Choate Manufacturing Co., Inc.**, Cedar Rapids, Iowa, died on Dec. 4.

# BULLETINS

**Gyratory Crushers.** Allis-Chalmers Mfg. Co. has just released a new bulletin (B6004-A) describing their Superior McCully gyratory crushers. Complete information on construction, including the oiling system, of these crushers is provided. Write to Allis-Chalmers 603, Milwaukee, 1, Wis.

**Rotary Dryers.** Allis-Chalmers Mfg. Co. has available a new bulletin (B6378) describing the company's latest developments in rotary dryers and coolers for the milling and processing industries. Address requests to Allis-Chalmers 605, Milwaukee, 1, Wis.

**Diesel Engines.** Long life of diesel engines is pointed out in a new publication (Form 9093) of Caterpillar Tractor Co., Peoria, 8, Ill., that describes owners' experiences with Caterpillar diesels.

**Electrodes.** Proper selection of arc welding electrodes is the subject of a 32-page bulletin released by Wilson Welder & Metals Co., Inc., New York, 17, N. Y.

**Safety Valves.** A complete line of safety and relief valves is described in a new catalog, No. 45, just issued by Farris Engineering Co., Palisades Park, N. J.

**Sealed Motors.** Crocker-Wheeler Division of Joshua Hendy Iron Works, Ampere, N. J., has issued a bulletin describing the company's line of Sealedpower motors for use in dusty or excessively moist locations.

**Trailer Truck.** The Tournatruck, a flat-bed, big-tired trailer truck powered by a Tournapull, is described in a bulletin of R. G. LeTourneau, Inc., Peoria, Ill.

**Synthetic Rubber.** A 12-page booklet recently published by B. F. Goodrich Co., Akron, Ohio, suggests applications for, and describes, new rubber and synthetic products of the company.

**High-Pressure Steam.** Cochrane Corporation, Philadelphia, Pa., has ready for distribution its publication No. 3250, which describes in detail their new high-pressure condensate return system, which is said to result in lower fuel costs and higher boiler capacity.

**Transformer Welders.** New and improved Wilson Bumblebee a.c. transformer arc welding machines are described in a 16-page booklet of Air Reduction Co., 60 East 42d St., New York, 17, N. Y.

(*Continued from Page* 91)

actions." The board contended that collective bargaining agreements should be in writing, signed and observed by both parties, and recommended that each agreement provide for appropriate guarantees, such as posting by each party of performance bonds to guarantee complete and effective compliance.

The board also went on record in favor of legislation to reimburse gold mine operators and owners for capital losses and unreimbursed maintenance costs (including taxes and interest on obligations) arising directly or indirectly from the gold mine closing order; continuation of a currency with a metallic base of both gold and silver; continued purchase and coinage of domestic gold and silver; repeal of the prohibitions against the free circulation of gold, and removal of the ceiling price on silver.

Other recommendations were: Creation of permanent stockpiles which could be released for purposes other than national defense only by express approval of Congress; tariff protection sufficient to offset lower labor costs and lower exchange rates of foreign producers; curtailment of the Government leasing system for mineral lands; no federal recording and proofs of annual labor; discontinuance of the present policy of the General Land Office in protesting applications for mineral patents and a return to the former liberal policy of granting patents; state control of rivers and lakes.

Tax recommendations included approval of repeal of the excess profits tax and capital stock tax and reductions in other rates and urged further steps toward creation of a tax system which will leave adequate incentive for investment and employment; urged that full allowance be made in taxation of dividends for corporate taxes already paid; establishment of an over-all ceiling of 50 percent on the individual tax or on the combined corporate and individual tax on dividends; also repeal of the excise tax on freight, and provision for the carry-back of unused excess profits taxes for two years instead of one year.

Board members elected for the coming year are:

Utah—W. C. Page, assistant to the vice president and general manager, U. S. Smelting & Refining Co.; J. D. Shilling, assistant general manager, Utah Copper Co., and A. G. Mackenzie, manager, Utah Metal Mine Operators' Association.

Idaho—L. E. Hanley, president, Hecla Mining Co.; R. D. Leisk, general manager, Sunshine Mining Co.; Harry W. Marsh, secretary, Idaho Mining Association.

Nevada—R. A. Hardy, Getchell Mine, Inc.; J. C. Kinnear, vice president, Kennecott Copper Co.; Henry M. Rives, secretary, Nevada Mine Operators' Association.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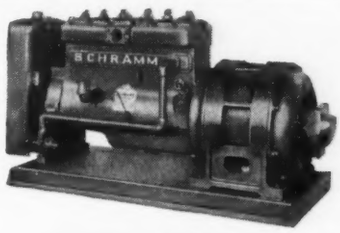
SCHRAMM
AIR COMPRESSOR
. . . for your every need!
SIZES RANGING FROM 2 TO 600 CU. FT. DISPLACEMENT

DIRECT DRIVE ON BASE

Built-in Motor Drive mounted on steel base is compact and easy to install. No foundations necessary.

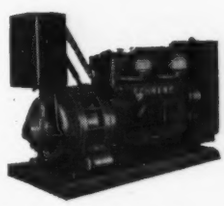
WITH "V" GROOVE PULLEY

Schramm Belt Driven Compressors can be obtained with "V" or flat belt drive suitable for twenty-four hour service and economical operation.



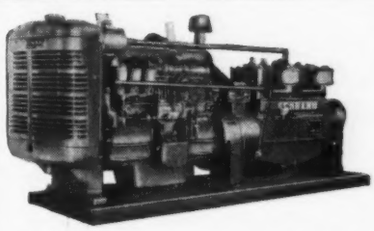

DIRECT MOTOR DRIVE WITH COOLING UNIT

Schramm 300 cu. ft. displacement with direct-connected 50 H.P. motor with cooling unit on Steel Deck Base.



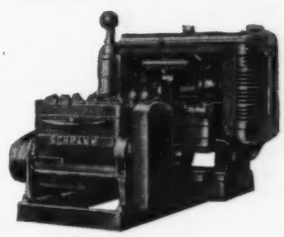
DIRECT DRIVE WITH STARTER AND RADIATOR

Both compressor and motor are mounted as a single unit on a substantial steel base with starter, radiator, and cooling unit.



DIESEL ENGINE DRIVE-IN LINE

Complete self-aligned, direct connected Diesel Engine Driven Compressor for semi-portable or stationary installation.



BELT DRIVE ON BASE WITH ENGINE

Schramm Engine Belt Drive on Base combinations are available for applications not reached by electric power service in mill, mine, and other industrial plants.

SCHRAMM INC.
COMPRESSOR SPECIALISTS
WEST CHESTER
PENNSYLVANIA

# REGIONAL NEWS

## MICHIGAN

### College of Mines expands facilities and modernizes courses—Calumet & Hecla maintains vigorous exploration campaign

★In addition to considerable expansion in activities and the physical plant already in evidence at the Michigan College of Mining and Technology at Houghton, Mich., current plans call for improved quality of courses and further expansion.

Before the war degrees were granted in mining engineering, geological engineering, and metallurgical engineering (including mineral dressing, which is a separate department). Degrees were also granted in chemical, civil, electrical, general and mechanical engineering, and in chemistry, forestry, and general science. The general engineering degree has been dropped and new degrees have been authorized in physics and engineering physics.

In compliance with recommendations of the Society for the Promotion of Engineering Education, more time will be devoted to the "humanistic stem." A separate department of engineering administration has been set up, which teaches economics, personnel administration, industrial psychology, industrial sociology, and American government and politics. Hours devoted to technical speech and writing will be increased and an elementary course in Portuguese will complement those in Spanish, French, and German.

Other changes include the offering of refresher work to war veterans and others whose education has been interrupted, and modernization of courses to present latest developments in alloys, electronics, and nuclear physics.

In modernizing graduate courses leading to a master of science degree, work has adhered more closely to industrial research and with numerous investigations which the college pursues as a State agency collaborating with the State Planning Commission and similar bodies.

Terminal courses in forestry, drafting, machine drawing and shops, surveying, assaying, chemistry, and business training are being offered by the college for men and women who are seeking practical training that does not lead to a degree.

The Michigan College of Mining and Technology has been cooperating with the University of Michigan and with Northern Michigan College of Education in adult education projects and in the establishment of an extension center at Ironwood, where more than 50 freshman students are enrolled. The College is also collaborating with the U. S. State Department in a project to promote Pan-American goodwill by bringing Latin-American students as speakers to schools and civic bodies.

At present the College is training 300 Army Specialized Training Program reservists and 125 more are scheduled to arrive this winter. Civilian enrollment at the College is increasing and consists of 42 women and 337 men, of whom 150 are veterans. Prewar peak registration was 1,015.

Buildings recently added to the plant by construction, purchase, or lease include a special shops training building, four dormitories, a health service center, a classroom and office building for the departments of forestry and military science, a cafeteria capable of holding 200 persons, and the James R. Dee Stadium for winter sports.

Other developments include a nine-hole gold course, and an outdoor winter sports area including a 1,550 ft. ski tow, chalet, and ski trails.

The new curriculum calls for three years of physical training, and a college policy places greater stress on developing in students a liking for those sports which have a carry-over value in later life.

The College has asked for funds to build an auditorium capable of seating 1,500 persons and a new mining and geology building. Mining Department laboratories in the new building will include ventilation, exploration and mine machinery, and research. The geology department will have laboratories for rock and mineral study; also X-ray, spectrographic, polished and thin section, and gem-polishing laboratories. The A. E. Seaman Mineralogical Museum will occupy space on the main floor of the proposed building.

The College has also requested appropriation to increase the present capacity of the Douglass Houghton Residence Hall from 200 to 370 men, and to build an apartment house for married students and faculty members, and an additional residence hall.

★Calumet & Hecla Consolidated is experiencing a shortage of miners and, consequently, under-production. When the Quincy and Copper Range mines shut down, a few men from those properties took employment with Calumet & Hecla, but in spite of this the present number of underground employees is less than that of the September total. So far, returning servicemen have not filled the gap, but the situation may improve.

An increase in underground production at Calumet & Hecla is considered essential if the effects of the exhaustion of the conglomerate sands is to be offset to some degree. In Centennial No. 2 shaft production is nearing the peak of the hoisting capacity of 1,000 tons of ore per day. The water in the shaft has been lowered to below the 44th level and is being held at that point. The shaft has been timered and skips have been placed in operation down to the 44th. Drifting on the 41st level south is in better than average grade ground.

In No. 4 Kearsarge shaft, drifting on both sides of the 29th level has been completed for the present and stope preparation is in progress. Drifting is under way on the 30th level.

The new Iroquois No. 1 shaft has a record of high production for the past two months. The rock is of fair grade. Stoping is being done on the 18th level north, 19th level north and south, and a new stope is being opened on the 20th level south. Drifting both ways is proceeding on the 20th, with better values in evidence in the south drift.

The new Allouez No. 3 shaft is down past the 11th level. Cutting of the 11th level plat has been completed. Drifting on the 10th level south has been completed and raising has been started. Drifting is under way on the 10th level north. Some stoping is being done in the 9th level north.

Diamond drilling and other examination of Calumet & Hecla mineral lands have been under way for many years, and at present this work is in full swing throughout the district. Every facility of the company's exploratory branch is at work on this project, with the hope that new veins will be found.

Engineers are making a survey of Calumet & Hecla's generator system with a view to making equipment changes to effect greater efficiency in power production.

## IRON COUNTRY

### Ore docks razed at Escanaba—Miners on Marquette and Menominee ranges vote to strike

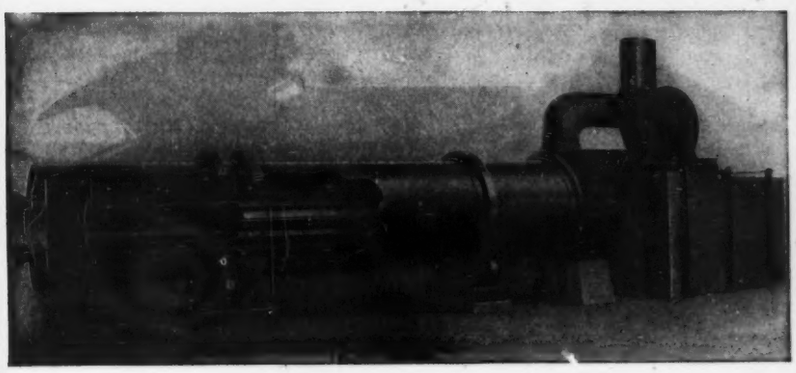
★The Lake Superior Iron Ore Association reports that shipments from upper lake ports totaled 4,145,322 gross tons for November, 1945, which compares with 4,672,367 gross tons for November, 1944. The season total to Dec. 1, 1945, was 75,643,715 gross tons, which compares with the season total to Dec. 1, 1944, of 81,170,538 gross tons. Monthly and seasonal totals for 1945 include 54,625 and 352,033 gross tons of Canadian ore, respectively.

★Razing and salvaging of the ore dock at Escanaba, Mich., built by the Government during the early part of the war to insure against failure of transportation of iron ore from mine to furnace, is approximately 60 percent completed, and should be completed by March 1. About 175 men are employed.

★A strike vote was taken by miners on the Marquette and Menominee ranges on Nov. 27 to decide if the National Strategy Committee of the United Steel Workers, CIO, should be given power to order a walk-out if they deem it necessary to gain an increase in wages of $2 per day. The vote carried by a margin of 5 to 2 for the walk-out. Two mining companies were excluded, the Inland Steel and the North Range Mining Co., whose locals will vote on the same question at a later date. On Dec. 11, a union committee met at Pittsburgh and adopted a resolution calling for a steel strike Jan. 14 at 12:01 a. m.

★At Marquette, Mich., the Cliffs Dow Chemical Co. is developing a special grade charcoal from scrap timber from trees not suitable for use in underground iron ore operations. This charcoal is for a carbon gas generator used in heat-treatment to produce certain hard and tough steels needed in machining steel castings. Controlled-atmosphere carbon-gas generators used in the process have increased in number from 75 to more than 1,000 during the war. In addition to charcoal, more than 20 products are derived from hundreds of carloads of second-grade timber at the plant.

★The process of making an iron powder extracted from Mesabi carbonate slate, now considered pure waste residue by mining companies, has developed chemically by the mine experiment station of the university, encouraged by the State. Prof. C. V. Firth was the chief developer of the process. The State has signed a contract with the Continental Machines Co., 1301 Washington Ave. South, Minneapolis, to produce iron powder at Aurora, Minn. The plant will be operating by Sept. 1, 1946, and will employ 45 persons directly. The iron powder is 99.7 per cent pure and the use of it in the die-pressing of steel parts saves tooling and increases the tensile strength of the product. It provides steel that is purer and stronger than present Swedish surgical steel products. The construction of a processing plant in northern Minnesota ties in with the announced intention of the Reserve Mining Co., of Cleveland, implemented by Pickands, Mather & Co., to build a taconite concentration plant worth $10,000,000 in the same area as the iron powder plant. A series of chemical processes will produce an iron powder which has already attracted the commercial attention of large motor corporations in Detroit. Continental

Diagram, Ruggles-Coles Class "XA" Dryer, showing flow of gases.

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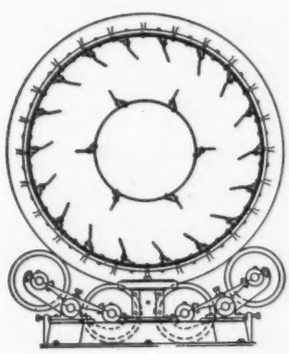

Cross-sectional view of Class "XA" Dryer...

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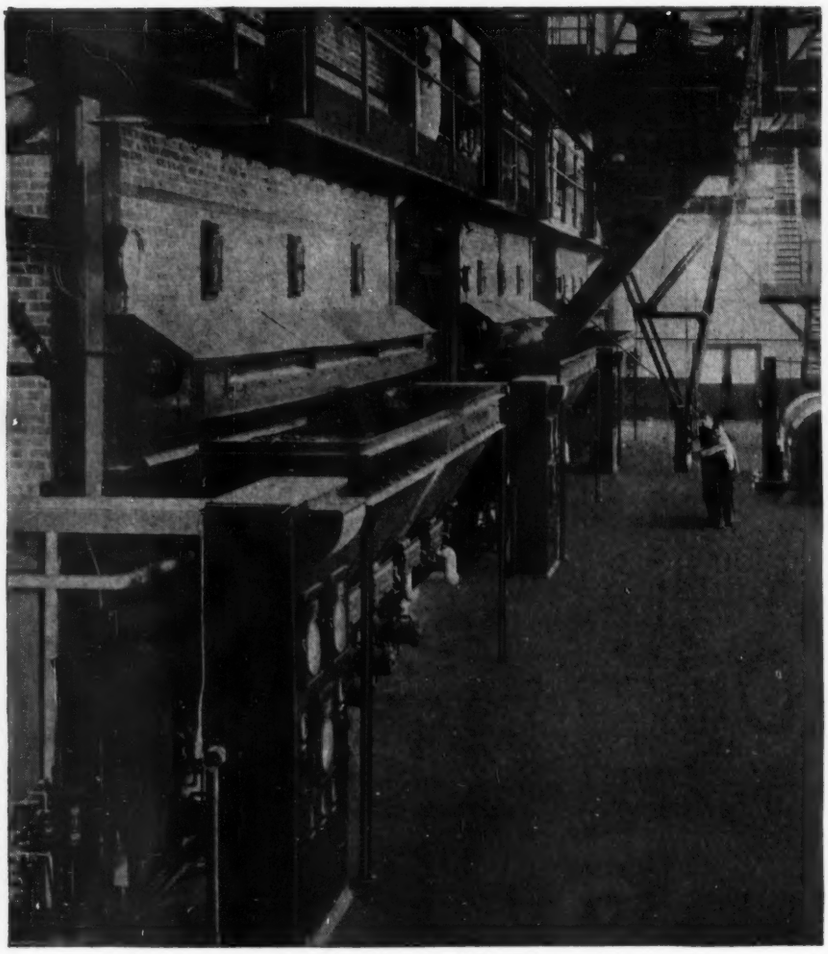

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## Iron Country *(continued)*

Machines Co. must furnish 50 percent of its iron powder output to Minnesota industries desiring to purchase it and it may use the other 50 percent in its own manufacture of tools and parts. The State of Minnesota will receive 1c. per pound of powder as royalty.

★Ore prospecting permits for iron ore on 17 State-owned mining units in northern Minnesota were awarded by the State Executive Council of Minnesota to two bidders. J. A. MacKillican, of Hibbing, was the successful bidder on 15 properties which include 9,000,000 tons of iron ore. Among the properties for which permits were given to MacKillican were the Yates mine, at Kinney; Shiras and Frantz, both at Buhl; Smith, Carson Lake, and Morton, all at Hibbing; Bennett Reserve, near Keewatin; Majorca and Draper, both near Calumet. Permits on the other two units were granted to the Reserve Mining Co., of Ramsay, Mich., on two properties covering 160 acres containing taconite.

★The Minnesota Supreme court has upheld the constitutionality of the "labor credits" provision of the iron-ore occupation tax law, automatically knocking out suits for $3,844,000 of tax refunds now pending against 33 Minnesota mining companies. John T. Lyons, of St. Paul, appealed to the high tribunal from an order by Judge Kenneth Brill in Ramsey County district court, sustaining Attorney General J. A. A. Burnquist's demurrer to the complaint. The decision sustaining Judge Brill upheld the contentions of the State that the labor credits were designed by the 1941 and 1943 legislatures as an incentive to mine low-grade ores.

## MISSOURI

### Bureau of Mines continues drilling at Alice mine—American Metals explores for lead near Fredericktown

★The U. S. Bureau of Mines is continuing to drill for zinc sulphide deposits below a zinc carbonate zone at the Alice mine, near West Plains. Some sulphide ore is being shipped from the mine to Central Hill of Eagle Pitcher Mining & Smelting Co., at Cardin, Okla.

★Reportedly as the outgrowth of indications revealed by magnetic prospecting, the American Metals Co. has started a drilling venture test for lead occurrences southwest of Fredericktown. Tom Rightly is in charge of the operations.

★The Pioneer Silica Co. has a large, well-established enterprise at Pacific, Mo. Silica sand is produced from consolidated siliceous sediments.

★Earl Doane, of Poplar Bluff, Mo. has sold his umber mine, near Altonburg, Perry County, to the George Mepham Corporation, of East St. Louis. Umber is iron and manganese rich material used chiefly in the manufacture of paint pigments.

★The M. A. Hanna property at Iron Mountain, about 70 miles south of St. Louis in St. Francis County, has been temporarily shut down. The mill is being repaired and remodeled to accommodate future production from the property. Hematite is the chief ore mineral obtained.

## ARKANSAS

### Nepheline syenite to be used for roofing—Committee discusses promotion of mineral industry

★Plans for construction of a $1,500,000 plant near Little Rock for manufacture of roofing granules and other construction specialties have been announced by Minnesota Mining & Manufacturing Co., of St. Paul, Minn. The company bought approximately 100 acres of the College Station quarry from the big Rock Stone & Material Co., of Little Rock. Company officials have stated that approximately 125,000 tons of weather-proofed roofing granules will be shipped annually. The material to be used is the nepheline syenite. Granules of suitable specifications will be colored with ceramic enamel for use in surfacing asphalt shingles and other products exposed to weather. The plant is scheduled to be completed by September, 1946.

★The old Housley lead mine, near Point Cedar, Hot Spring County, is being reopened after an inactive period of more than twenty years. The shafthouse and another building have been rehabilitated. A gasoline hoist, gasoline-powered generator, and a deep-well pump have been installed. The shaft is now being dewatered, but the amount of proposed operation has not been announced. The extent of the old workings is not known. According to old reports, the deposit is a fissure vein carrying considerable values of lead and some silver.

★The Minerals Committee of the Arkansas Economic Council, at a meeting on Nov. 15, 1945, discussed the need of promoting the development of the mineral industries in the State. An annual Minerals Industries Conference to bring together producers, consumers, and others interested in development and growth of the abundant mineral resources of the State was tentatively planned. Planning and execution of such a program will be dependent on the Arkansas Resources and Development Commission and Harold Foxhall, State Geologist.

★The question of whether or not Metals Reserve will close down its buying


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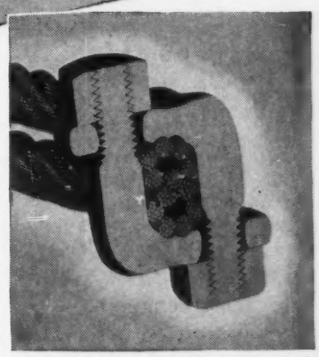

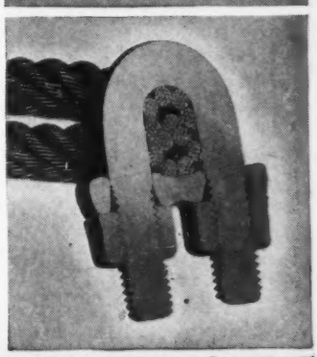

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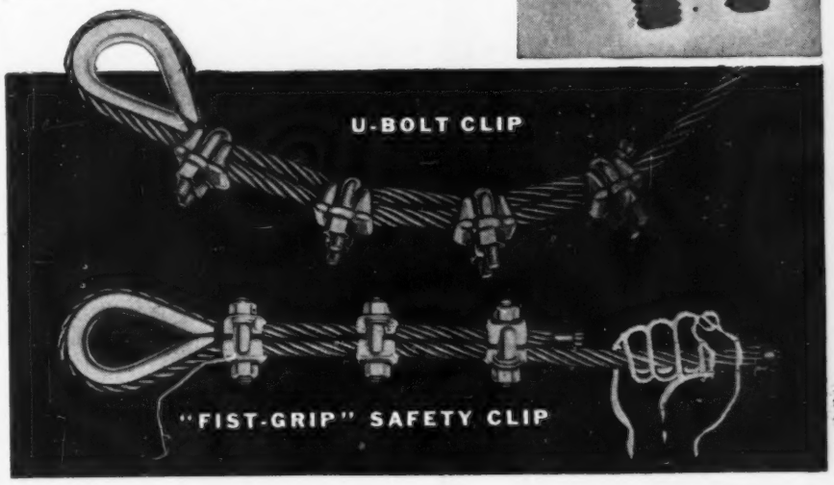


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## Arkansas (*continued*)

depot at Batesville is causing considerable concern among manganese producers who pushed production during November to sell as much ore to Metals Reserve before a possible shutdown. Operators are also seeking contracts with furnaces, so that if the depot is closed a continued market will be provided.

★Production in the Batesville-Cushman Manganese Field in November totaled 728 tons of high grade and 480 tons of low-grade. Individual producers were as follows: R. P. Potashick & Co., operating on Southern Hill, 470 tons of high-grade; Arkansas Manganese Co., 131 tons of high-grade and 282 tons of low-grade; Walter H. Denison Manganese Co., 85 tons of high-grade and 198 tons of low-grade (most production is from the Ozark, in the Pfeiffer district); and Polk-Southard Mining Co., 42 tons of high-grade.

## TRI-STATE

### Producers association elects officers —Prospect drilling programs are under way

★Officers of the Tri-State Zinc & Lead Producers Association were re-elected at an annual meeting of the association held Dec. 7 in Picher. O. W. Bilharz, of Baxter Springs, again was chosen to head the organization for another year. Other officers renamed were H. A. Gray, of Joplin, first vice president; George W. Potter, of Joplin, second vice president, and L. G. Johnson, of Baxter Springs, treasurer. F. F. Netzeband, of Joplin, acting secretary of the association, will continue as such. Two new directors—R. L. Dean, of Baxter Springs, to succeed H. H. Utley, and M. R. Loveman, of Joplin, to succeed Victor Allen—were elected. Other members of the directorate, which includes the elective officers, are R. H. Beck, S. L. Kenney, and Charles A. Neal, of Miami; Paul Childress, F. W. Gooch, and D. G. Harrison, of Joplin; H. H. Hartzell and H. G. Weidman, of Baxter Springs, and J. J. Inman, of Webb City.

★M. & W. Mining Co., Inc., has purchased the old Barnsdall mill of the Bilharz Mining Co., on the Brewster land, a mile northwest of Baxter Springs. D'Arcey L. Mundon and W. R. Welty are associated in the operation of the former company, which operates several mines east of Picher, including the Nos. 2, 3, and 7. on the old Huttig lease, the old Federal Brewster mill shaft, or No. 1 mine, and a new mine developed by the company on the Brewster 96-acre tract, which borders on the south of the Oklahoma-Kansas State line west of Hockerville. Ore from these mines, which formerly was treated at the No. 1 mill of the Back Mining Co. on an adjoining lease west of the old Federal Brewster, has been shifted to the Kansas mill. A new compressor room housing two large 888-cu. ft. compressors has been built at the M.&W. offices near the old Huttig mill site. Air for mining purposes formerly was furnished the company by the Beck firm. Acquisition of the mill, formerly owned and operated by O. W. Bilharz, of Baxter Springs, by the new owners became effective Nov. 15. Bilharz has moved his office, comprising a two-room structure, from the mill site to the old Billharz home in Baxter Springs.

★Cameron & Henderson, Inc., who have maintained offices on the old Golden Hawk lease, in the southwest part of Picher, for many years, have moved operating headquarters to the old Laviron mill site on the Admiralty lease. S. E. Henderson, of Baxter Springs, is manager of the company, which operates the Admiralty mines, a mile southeast of Picher, and the Romo mill, near Lincolnville.

★Eagle-Picher Mining & Smelting Co. has extended its prospect drilling program from the 160-acre Mullins lease to the Alva Chubb, 160 acres adjoining to the north, and also on the west side of the Columbus-Pitcher highway and south of U. S. Highway 166. Federal Mining & Smelting Co. is doing some propect drilling in the Quapaw area, as is the United Zinc Smelting Corporation. The latter company is completing its new mill on the Park Walton lease. To the northeast from the Park Walton, Fred Childress and the U. S. Bureau of Mines have been checking previous drilling on the Vanatti land.

★The mine mill of the Capital Mining Co. at Stotts City has resumed operation and is re-treating tailings.

★C.G.&E. Co., which leased the Northside mill, northwest of Chitwood, is treating some custom ore preliminary to the treatment of ore from the Potter ranch, west of Joplin and south of the 20th Street road to Galena, where the company is sinking a new shaft and reopening an old one in the immediate vicinity of drilling done during the last year by George W. Potter, of Joplin, owner of the ranch.

★Another exceptionally good milling ore was reported Dec. 1 by W. D. Brittain, of the Little Pat Mining Co., which is operating a rich shallow mine development on the Missouri Lead & Zinc Co.'s land near 22d St. and Wisconsin Ave. in the southeast part of Joplin. From a milling of 497 tons, 134 tons of blende and 9 tons of lead were recovered, averaging approximately 27 percent in zinc concentrate recovery and about 1.8 percent galena, according to B. D. Bensing, of the St. Louis Mining & Milling Co., which operates a custom mill at Thoms Station, where the ore was treated. The company put down a shaft on the land a year ago and another one this year after making several rich strikes of ore by churn drilling in the area. The

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## Tri-State *(continued)*

last milling was taken from a drift being driven out north from the second shaft, which is less than 100 ft. south of the first shaft, on the 50-ft. level. Another drift to the east on the 65-ft. level, which is not being developed at the present time, also shows a rich heading of ore, and drilling further to the southeast shows a lower run of ore around the 150-ft. level. Associated with Brittain are George Minshall, veteran driller, and his son, Hazelton Minshall, and Charles Roberts, an old-time soft-ground miner in the Joplin district.

# COLORADO

### Major issues to be discussed at Colorado Mining meeting—Leadville tunnel item eliminated from appropriations bill

★Invitations to the Colorado Mining Association's postwar meeting at Denver on Jan. 24-26 inclusive have been extended, in addition to the usual representatives in the 17 Western states, to industry members in Oklahoma, Kansas, Illinois, Missouri, Wisconsin, and Minnesota. Discussion will cover all reconversion phases of mining.

Topics already assigned for discussion include: U. S. mineral reserves, with representatives of State mineral resource departments, U. S. Geological Survey, and U. S. Bureau of Mines participating. The latter will include Elmer Pehrson, chief of the economics and statistics branch of the Bureau, with whom many Western mining men are in disagreement because they think his estimates of minerals still in the ground in the U. S. are low.

Cost-cutting will be discussed with men from the equipment industry, and with practical mining men and engineers. Robert S. Lewis, of the University of Utah, will discuss ventilation problems of small mines, and a representative of Battelle Institute, Columbus, Ohio, will talk on the future of metals.

Stockpiling will be discussed by Senator O'Mahoney, of Wyoming, and others; the future of silver will be taken up by Senators Abe Murdock, of Utah, and Elmer Thomas, of Oklahoma; and that of gold (including the pending bill to compensate gold-mine operators for the war shutdown) by Representative Clair Engle, of California. Senator Pat McCarran is expected to discuss a public lands policy; Carl Wilken, consulting economist, will discuss the miners' stake in a parity-price policy; and former Senator D. Worth Clark, of Idaho, thought by some to be the leading prospect as next Secretary of the Interior, will discuss the government's future policy regarding natural resources.

★The Ore & Chemical Co.'s heavy-media separation plant was temporarily closed early in December, not by local trouble, but because of strikes at two smelters supplied by the mill, one in Texas and one in St. Louis, which caused a pile-up of the local plant's product. Kurt Spohr, superintendent, said that repairs and other necessary work would be done in addition to standby activities, to keep older members of the crew at least partly employed until full operations resume.

★Operating of the Resurrection mine, near Leadville, was recently interrupted because of flooding. It took several days to repair pumps which broke down, and to reduce the water to workable levels. The water had flooded the 1,200 station, and the workers had to use rafts for exploring the situation.

★The Buckskin Joe mill, near Fairplay, was reported destroyed by fire, apparently arising from spontaneous combustion in the coal-pile. It had been operated by John Harvey, of Leadville, and Charles Jordan, of Buena Vista.

★Gold deposits at the Denver mine increased in November over the same period of 1944, but showed a slight decline compared with October 1945, receipts being 22,741 oz. in November 1945, against 12,310 oz. in November 1944, but 24,705 oz. in October 1945. Silver deposits continued a steady climb—10,244 oz. in November 1945, compared to 10,005 oz. in October, and to 2,982 oz. in November 1944.

★Operators of the Dixie mine, up Ute Creek, have leased the Barrick mill, at Dumont, and have put in electric power. Resumption of mining operations has been delayed by several weeks' work necessary to clear out cave-ins which developed during the closed-down war period.

★The Douglas mine, operated by W. D. Fenicle and Adolph Haeske, of Idaho Springs, is producing a silver ore which is showing signs of gold values. Operators have built a new road to the property for winter operation, and a new compressor has been installed.

★Fred Wilson has opened up favorable lead and zinc prospects on Cascade Creek, and two Clear Creek County operators who have acquired the Katie Emmett, on Cascade Creek, are reported to plan operation by next Spring.

★Midland Terminal R.R., serving Cripple Creek, has ordered 50 new dump-type ore-cars to speed up unloading at the mill at Colorado Springs necessitated by increasing shipments from resuming field operations. Lessors are reported in increasing numbers, and Golden Cycle and other operators are increasing activities as fast as miners can be obtained.

★U. S. Vanadium Corporation has


# Here's A Practical Way to Test Manganese Steel Chain . . .

Austenitic manganese steel chain has an initial cost a little higher than ordinary chain, *but in the severest service it has given twice to ten times the service life*, which makes it highly economical in the long run. It is impossible to realize the difference in performance until you have actually used chain made of "the toughest steel known."

A convenient and practical way to ascertain whether manganese steel chain will save you money is to inspect the elevator and conveyor chain in your plant. Where you find weak links which will soon need replacement, order Amsco manganese steel links to replace them. Amsco chain and attachments are available in most standard types and sizes, all interchangeable with ordinary chain.

By comparing the life of the manganese steel links with those you have been using, you can accurately determine which are lowest in ultimate cost. This experiment is well worth while, as it has pointed the way to substantial reductions in chain costs in steel plants, mines, cement, lumber and pulp mills, quarries and in general industry.

One reason for the superior performance of Amsco chain is found in the properties of austenitic manganese steel. Presenting a test-bar tensile strength of 125,000 lbs. p.s.i. (average test) and a developed-in-service surface hardness up to 550 Brinell, combined with a ductile, shock-resistant body metal, Amsco chains withstand for long periods abuse that quickly destroys chains of ordinary metals.

*C-120. No. 830 conveyor chain with F-25 attachments made for an automobile manufacturer.*

*A-190. Ten strands of Amsco No. 847 pintle type chain with K-2 attachments every other link for a California cement mill.*

Send for Bulletin 742-CN, "Amsco Manganese Steel Chain for Elevating and Conveying."

**How Amsco-Nagle Centrifugal Pumps Resist Abrasion and Corrosion is detailed in Bulletin 940.**

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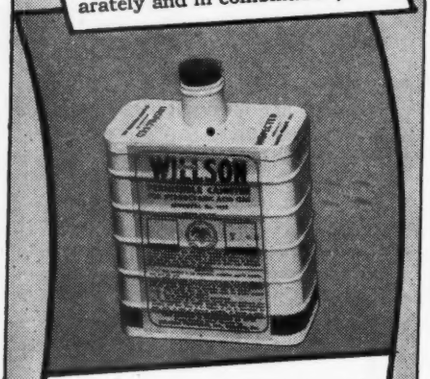


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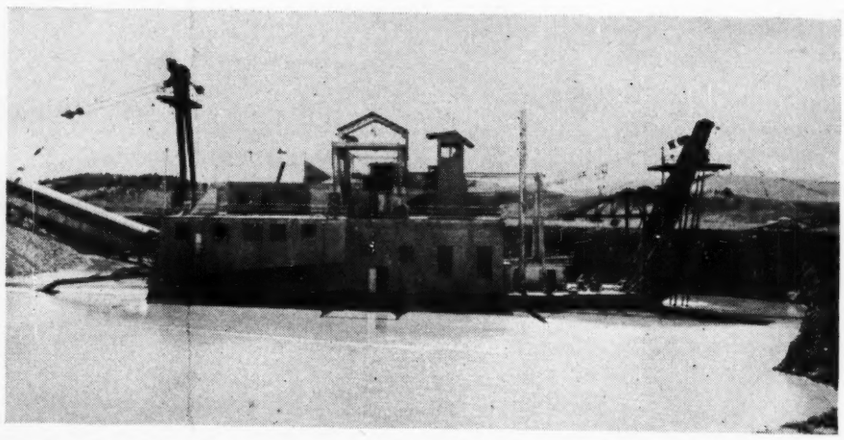


**GOLD DREDGING WAS RESUMED in Colorado last summer when this 11-cu. ft. dredge of South Platte Dredging Co., operating near Fairplay, took up where it left off when L-208 was issued. Designed and built by the Natomas Co., this dredge makes use of such modern operating practices as variable-speed d.c. digging motors, air brakes and electric frictions on winches, separate ladder hoist, and swing winches.**

## Colorado (*continued*)

closed down its Grand Junction mill and retained only a small standby crew of the 160 men employed during the war. Operations at Durango and Uravan have been closed down for some time. The mine at Rifle has also suspended work and the mill is operating at about half capacity, on stockpiled ore.

★A manganese producing property south of Silverton has been leased by Edward Nelson and B. K. Hill and preparatory work is under way.

★House and Senate Conferees have eliminated a $485,000 item which was included in the Deficiency Appropriations bill for the continuation of the Leadville drainage tunnel. Edward D. Dickerman, Leadville mining engineer had previously spent several weeks in Washington in the interest of the tunnel project, and most Leadville operators had signed agreements to pay a royalty of from 2 to 5 percent on the value of ores (rendered accessible by the tunnel drainage) above tunnel level, and of 1 to 2 percent of the value for such ores below the tunnel level, to help reimburse the government for the cost. This postpones hope for an appropriation until the regular Interior Department bill is acted upon.

# UTAH

### Strike authorized but not called—Major companies seek favorable tax decisions in State and federal courts

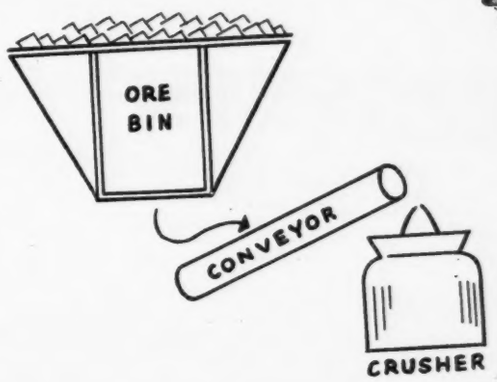
★Utah and eastern Nevada's nonferrous metal mining and smelting industry still was in a quandary Dec. 15 as to whether or not a strike would be called by officers of district union No. 2, International Union of Mine, Mill & Smelter Workers, CIO, as authorized in a strike vote, results of which were announced Nov. 15 by the National Labor Relations Board. The time and extent of the possible strike also were problematical. At a meeting of the district union's policy committee Dec. 6 and 7, Dan Edwards, Salt Lake City, international executive board member, reported on findings of the international executive committee relative to possible strike, but the authorization or lack of authorization given by the international body for a strike was not disclosed. Negotiations in the dispute still are in progress with some operators, and other conferences may be started soon, J. Frank Marble, district president-secretary, reported. The district union's next annual convention was fixed for next April at Ely, Nev.

Union representatives have insisted that wages be raised to levels prevailing in the Coeur d'Alene district, Idaho. Operators pointed out that mines still are operating on a six-day, 48-hour week and "take-home" pay has not been reduced since the end of the war. They have expressed willingness to reopen negotiations on wages if and when the 48-hour week is abandoned and the workers' "take-home" pay is reduced.

Complicating the issue as affecting Utah Copper Co. and its employees is the question of travel pay for employees going to and from work on extensive company properties. The War Labor Board directed the company last May to pay employees for such travel time and to negotiate amounts of time, points from which travel pay would be paid, rates of pay and other matters. Issues which could not be settled were to be submitted to the commission. At a meeting in November held at the Utah State Capitol the copper company declined to submit the issue to the War Labor Board.

★American Smelting & Refining Co.'s lead-silver smelter at Murray was re-

*The Problem —*
*to feed heavy, large lumps ore from bin to conveyor at a rate of 4000 tons per day, without equipment failure*

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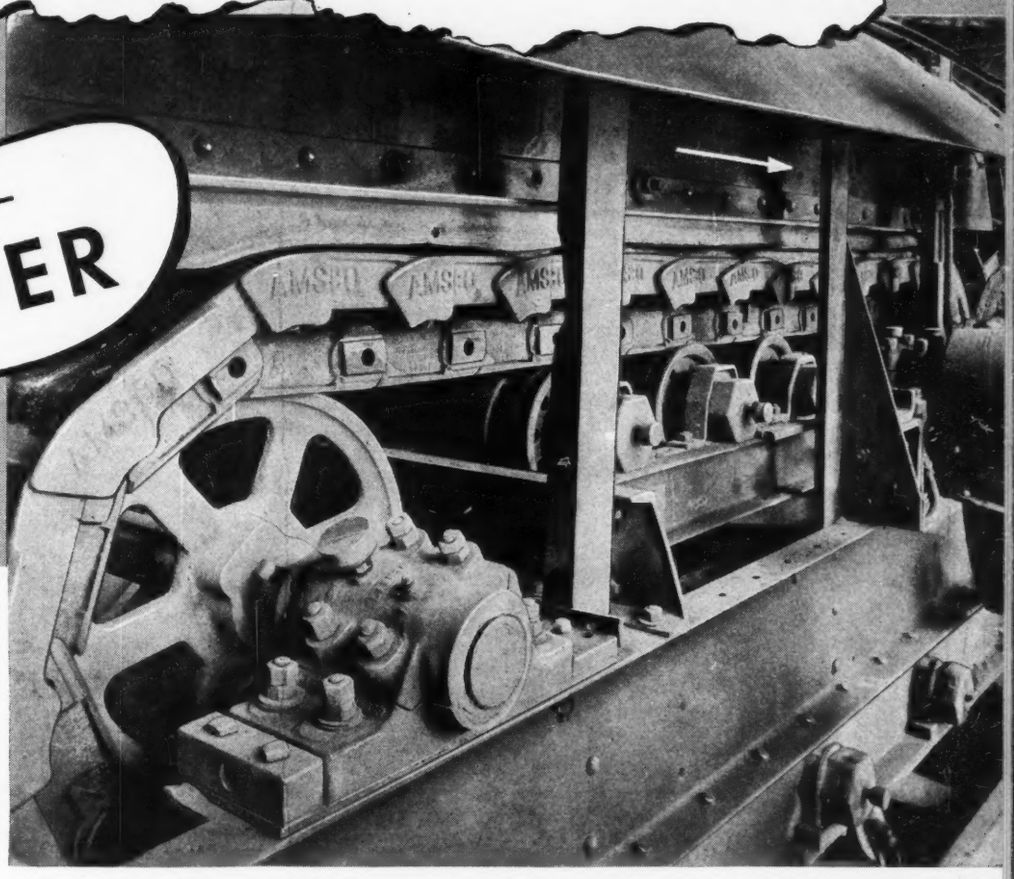

The AMSCO Manganese Pan Feeder, installed in 1929, feeds large lumps of ore from the bin to a crusher-bound conveyor. Its long record of dependable service proves its ruggedness. With its manganese steel parts, and its engineered design and construction, the AMSCO Feeder is truly the heavyweight champion of all feeders.

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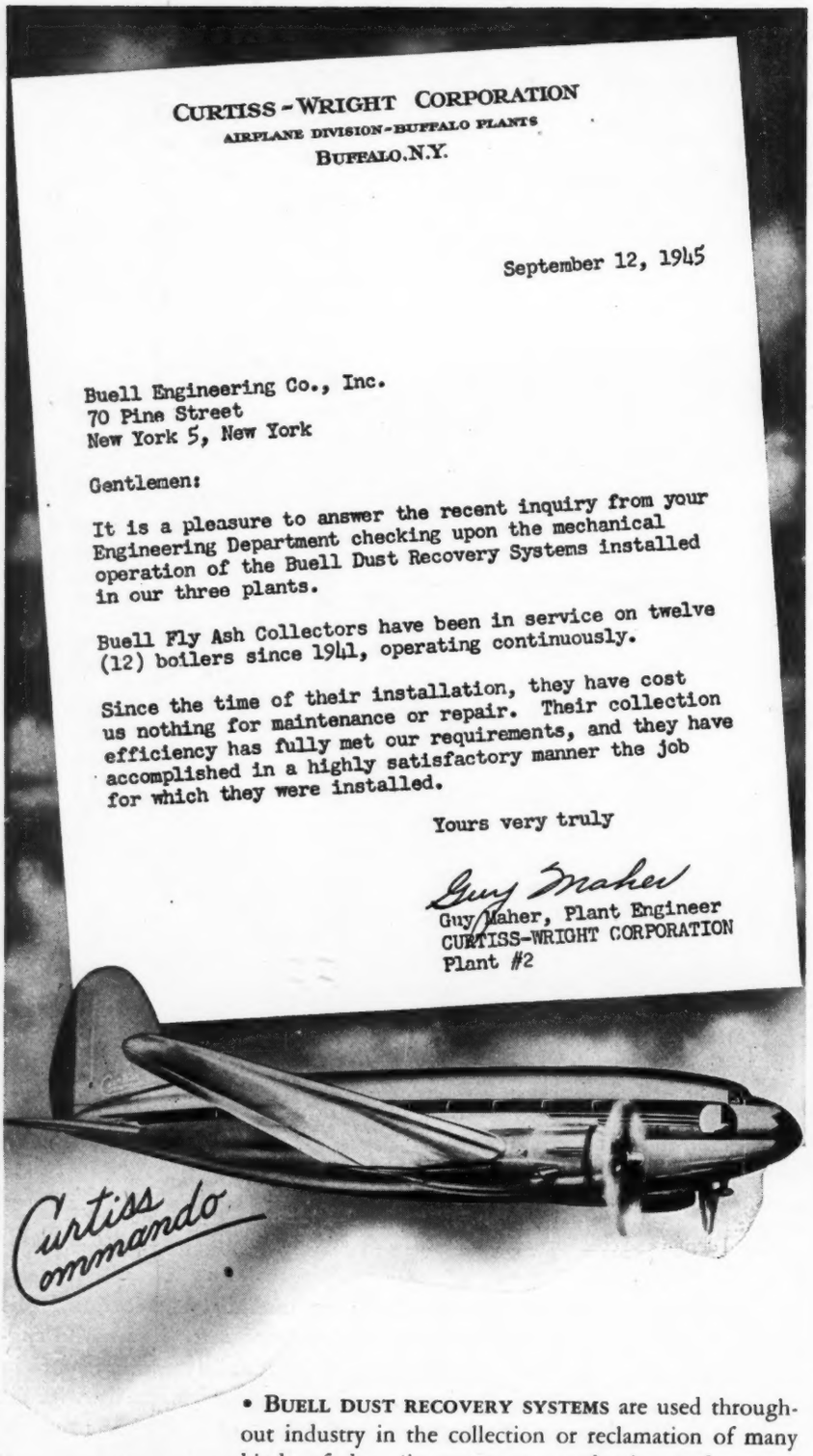
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## Utah (*continued*)

opened Nov. 15 after having been closed since May. William J. O'Connor, manager of Utah operations, AS&R, said available ore will keep the plant and its approximately 200 workers busy probably beyond next June.

★The Reconstruction Finance Corporation's Salt Lake City alunite plant, operated by Kalunite, Inc., still is producing substantial quantities of alumina and, as a by-product, high-grade potash, S. J. Burris, Jr., general superintendent of the plant, reported Dec. 15. He had received no word concerning persistent reports that the plant will be closed down. More than 150 persons are employed at the plant.

★Iron ore production in Utah in September was 138,606 tons, compared with 170,015 tons in August, reflecting curtailed steel production at Geneva, Utah; Pueblo, Colo., and Fontana, Calif.

★The Apex Standard area of Chief Consolidated Mining Co., East Tintic district, has been leased to J. K. Gustafson, acting for Newmont Mining Corporation, New York City. The Apex Standard area has yielded some production, having been opened up by two working shafts.

Newmont, represented by Mr. Gustafson, several weeks before obtained a similar lease on the East Utah property in the East Park City district, which property was held under option in 1929 by American Smelting & Refining Co., which did 2,000 ft. of development work.

★A three-man arbitration board headed by Robert C. Williams, chief mediation officer, 10th Regional War Labor Board, acting in private capacity, settled three matters in dispute between Utah Copper Co. and more than 100 white-collar employees at its Arthur and Magna mills, at a one-day session Dec. 11. Points in dispute were: Pay for the two V-J days, Aug. 15 and 16, which the company agreed to remit to workers; right to make up lost time without pay deduction, granted to the employees, and alleged violation of presidential order 9240 providing for overtime pay for work on the seventh day of any week or for work on any of six specified holidays. Company views on the third matter were upheld. Other members of the arbitration board were Roy Hatch, superintendent, Arthur mill, and Charles R. Brooks, vice president, Non-Ferrous Clerical and Technical Workers Local 692 of District Union No. 2, International Union of Mine, Mill & Smelter Workers, CIO.

★Major Utah mining companies again have filed suit in the state's Third District Court seeking judgments against the State Tax Commission for taxes paid under protest based on government metal subsidy payments. The district court last May held that the tax commission was not entitled to

collect taxes based on income from federal subsidies. The tax commission appealed the case to the State Supreme Court, which has not yet handed down a decision. . . . The same matter also has been appealed to the United States Supreme Court. The Federal District Court for Utah had held that the federal subsidy payments were not subject to taxation, but this decision was reversed by the U. S. 10th Circuit Court of Appeals last May. Kennecott Copper Corporation and others appealed the case to the national Supreme Court.

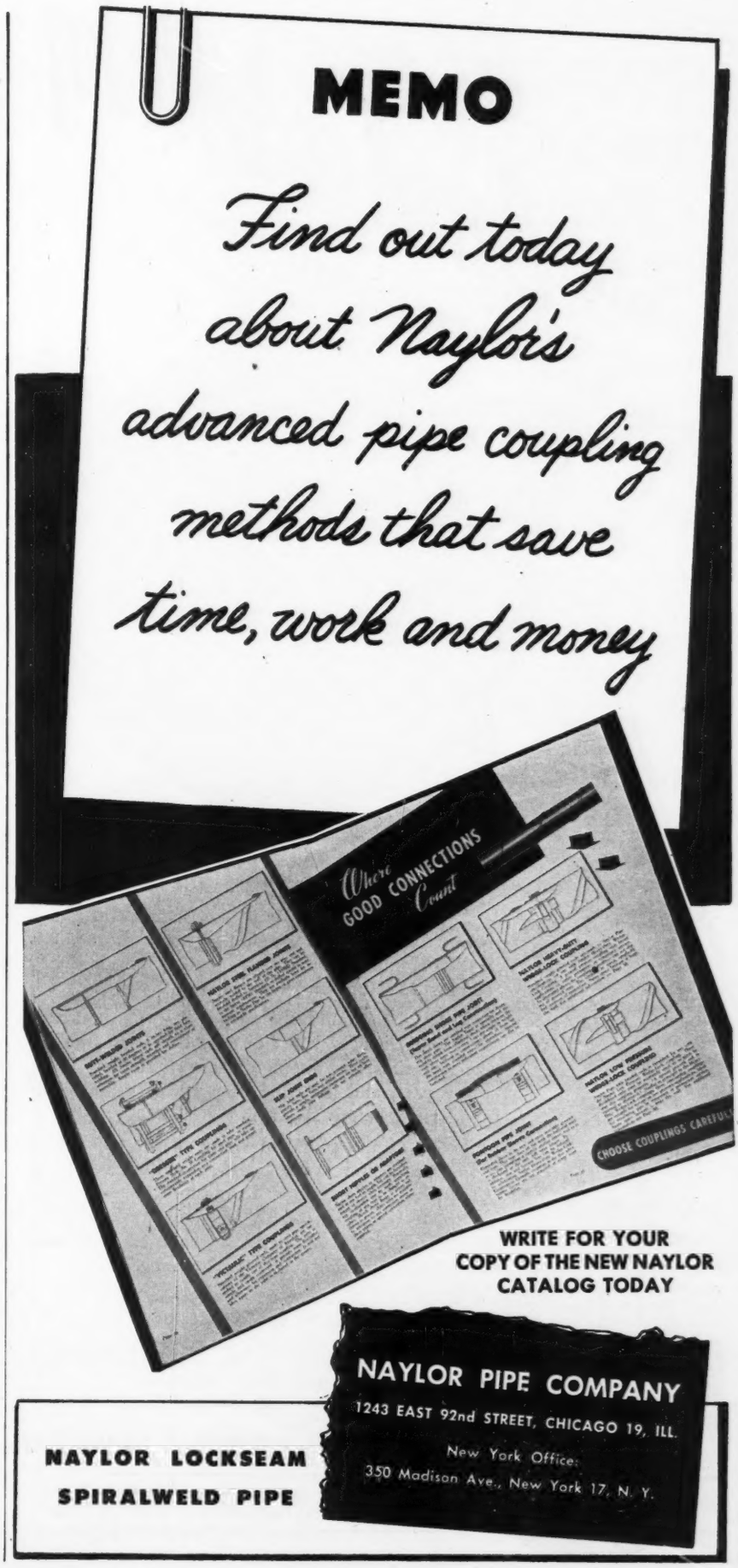
## NEVADA

### Tonopah to construct new mill—U. S. Vanadium develops Riley tungsten property

★Officers of the Tonopah Mining Co., of Nevada, have announced completion of designs for a 100-ton cyanide mill to be constructed early in the spring of 1946 at the Mizpah mine, center of the company's Tonopah operations. Estimated cost is $150,000 and plans provide for doubling plant capacity if the demand arises. H. A. Johnson, in charge at Tonopah, said the Mizpah mine, with ten leases now in operation and more in prospect, probably can supply 100 tons per day, but custom ore will be accepted from other districts and a sampling unit will be provided.

★Underground work in the Copper Canyon gold-copper mine, 18 miles south of Battle Mountain in Lander County, was taken over by the Copper Canyon Mining Co. on Nov. 16, International Smelting & Refining Co., Anaconda subsidiary, having relinquished its lease effective Nov. 30 and Copper Canyon Co. assuming operation of the 400-ton flotation mill on Dec. 1. Robert H. Raring, manager and resident engineer, reported shortage of labor but planned to increase millfeed as workers became available. Several key men of the International staff are remaining, L. E. Snow continuing as mine superintendent and Ralph Hayden in charge of the mill.

★Notice from the Surplus Property Administration at Washington announced that the Basic Magnesium, Inc., plant at Henderson, with its water supply and power facilities, and the magnesite deposits, processing plant and buildings at Gabbs, Nye County, had been listed as surplus property, with the recommendation that they be "sold or leased for other uses or converted to warehouse space." Conversion of the huge Henderson plant for chemical projects has been in progress for several months, and H. H. Gillings, manager for the J. M. Montgomery Co., in possession for Defense Plant Corporation, indicated that the surplus property order will not affect plans of three chemical manufacturing companies involved. Structures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## Nevada (*continued*)

at Henderson or at isolated Gabbs are not likely to be in demand for warehouse use.

★U. S. Vanadium Corporation has proceeded with sampling and further development by a series of open cuts at the lately purchased Riley tungsten mine, in the Potosi district, eastern Humboldt County, and is preparing to enlarge the 200-ton concentrator to 500 tons per day capacity. Vanadium Corporation officers confirm reports that the company has taken an option on the Alabama low-grade gold mine at Awakening, central Humboldt County.

★The old Rye Patch mine, an early-day silver bonanza in the Humboldt Range, Pershing County, is being reopened by R. F. Rose and C. L. Winnery, of Winnemucca, who have provided camp facilities and are preparing to build a 50-ton cyanide mill.

★The Chemical & Pigment Co., E. L. Ralston, manager, during the past season reported shipments of 10,000 tons of barite from the Battle Mountain property of California-Nevada Barytes Co. and 3,000 tons from that company's deposits at Ellendale, east of Tonopah. The product was shipped to Alameda, Calif., for processing. Both companies are said to be units of the Glidden Co., paint manufacturers of Cleveland, Ohio.

★The Gold Point Mining Syndicate, R. W. Varnon, manager, at Goldpoint, 35 miles south of Goldfield, is repairing a 200-ft. vertical shaft on the Gold Eagle group, lately purchased and adjoining the productive gold property of the Ohio Mines Corporation, which is preparing to resume operation of its 150-ton cyanide mill. The Gold Point Syndicate, headed by Hawthorne men, has arranged for use of the nearby 50-ton mill of Nevada Gold, Inc.

★The Gold Coin gold property, embracing 38 claims and a 160-acre homestead in the Chalk Mountain district of Churchill County, has been acquired under option by A. E. Hepburn, mining engineer of Grants Pass, Oregon, from John Bozanes, rancher, who has developed the ground intermittently during 35 years. He has sunk a 200-ft. vertical shaft and accomplished some 1,100 ft. of lateral work, using a 10-ton Straub mill for test runs.

★A gravel-washing plant is reported to be handling 2,000 cu. yd. per day of detrital material on claims in the Rosebud placer district in Pershing County, leased from the Rosegold Placers, Inc., of Reno, by Poston Brothers, of Kalispell, Mont. The mobile plant is on skids, with stacker, the gravel delivered by bulldozer and scraper. The district has produced some $300,000 in small-scale work, chiefly by "snipers" using primitive dry washers.

★At the once-productive gold camp of Searchlight an incipient boom is under way. Three hotels and several gambling casinos are under construc-

tion, with prospect of early activity in building the near-by Davis dam, on the Colorado River below Boulder. Three or four of the old mines are being reopened, including the productive M.&M., idle in late years, and the Blossom, from which H. C. Mills, head of the Golden Dawn Mining Co., in the past few weeks has shipped four carloads of high-grade gold ore.

★Building construction and delivery of equipment continue at the four-compartment Fad shaft of the Eureka Corporation, Ltd., subsidiary of Ventures, Ltd., of Toronto, on Ruby Hill near Eureka. Shaft work was halted late last year at 600 ft. by the burning of the power plant, now replaced with heavy-duty diesel units. Steel "rings" are being set in the shaft to provide for concreting, and pump and air pipe are in place. George Mitchell is manager at Eureka and William Sharp is general superintendent.

★Prolonged hearings in the district court at Ely have failed to solve the question whether, in the meaning of the state mining laws, a "bat cave" from which guano is produced is a mine. Matt Murphy, state inspector of mines, sought to enjoin the Interstate Guano Co., headed by Utah men, from employing miners to work in a natural cave high in mountains of White Pine County and inhabited by swarms of bats. Murphy declared the cave to be unsafe and demanded timbering. The court at first ruled that the operation was a "mining venture," but later reversed this decision and awarded judgment, including costs, to the guano company.

## ARIZONA

### Phelps Dodge starts 400-ton mill and ships lead-zinc ores to custom mills

★The Warren lead-zinc mill of Phelps Dodge Corporation, at Bisbee, began operations on Nov. 17. The mill will treat around 400 tons of lead-zinc ores daily derived from various zones of the Phelps Dodge mines of Bisbee.

Phelps Dodge Corporation, of Bisbee, is also shipping lead-zinc ores to the custom mills of Shattuck Denn, of Bisbee; the Peru Mining Co., of Deming, N. M., and the Eagle-Picher Mining & Smelting Co., of Sahuarita.

★Big Spar Mining & Milling Co., of Wickenburg, has started operations. J. A. Campbell is general superintendent. Plant capacity is 50 tons per eight hours. Ores from company mines in the Wickenburg area will be treated. About ten men are employed.

★The Arizona State Tax Commission has ordered the Magma Copper Co., of Superior, to pay $26,367.35 plus 6 percent interest in additional income taxes for 1939 and 1940. The Commission settled a four-year controversy over

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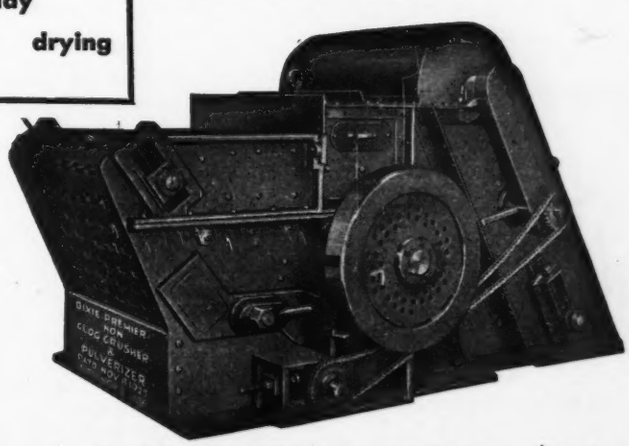

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## Arizona *(Continued)*

the method of computing the Magma's taxes, centering on the payment of taxes on income assignable to the State.

★The Camp B mine, in the Blue Tank mining district, near Wickenburg, has suspended operations due to manpower shortages. This property is a copper producer and has been operated by N. S. Oberan, of Wickenburg.

★Eunice M. Eldridge, of Bisbee, has filed application for a U. S. patent on five mining claims in the Hartford mining district, in Cochise County. The claims are the White Lily No. 2, White Lily Fraction, White Lily, Blue Bell, and Lotus Blossom lodes.

★The Tennessee mine, at Chloride, is being examined by Robert A. Elgin, who was active in mining enterprises in the Chloride district several years ago.

## CALIFORNIA

### Mines department to make mineral market survey—Gold dredging operations increase

★To stimulate greater economic utilization of minerals, the Department of Mines has undertaken as a new activity the Mineral Market Survey under the direction of Dr. Arthur A. Center. As announced by W. W. Bradley, State Minerologist, the survey will include studies of the mineral industries in the State, with particular emphasis on the non-metallics, stressing the marketing and consuming features. Simultaneouly, the department, in conjunction with the U. S. Geological Survey, is conducting a geological survey of areas in California where it is hoped new deposits of industrial minerals will be found. This study, scheduled to take two years and to be completed in July, 1947, was made possible by a $200,000 fund, to which each agency contributed $100,000. Dr. Olaf Jenkins, State Chief Geologist, heads the project.

★Coronado Copper & Zinc Co., controlled by Harvey S. Mudd, of Los Angeles, after securing an option from the Glidden Co., has reopened the old Afterthought zinc-copper mine at Ingot, Shasta County, with a view of carrying out an extensive development program. Lyttleton Price, company engineer, is in charge of the work. A crew is engaged in retimbering and cleaning out the mine workings. The mine, idle since 1928, is developed to a depth of 400 ft. by two shafts and one tunnel, and when operated by the Glidden Co. from 1925 until 1928 ore was transported via an 8½-mile aerial tram to a 300-ton flotation plant at Bully Hill. Concentrates were shipped by rail to Oakland, and then by ship to Antwerp, Belgium. The present operators plan to produce both zinc and copper concentrates.

★Gold-dredging operations have taken a decided upswing since rescinding of Order L-208. Work has recently been resumed by the LaGrange Dredging Co. in Stanislaus County, French Gulch Dredging Co. in Shasta County, Derby Dredge and Snelling Gold Dredging Companies in Merced County, and Thurman Gold Dredging Co. in Shasta County. Yuba Consolidated and Natomas Co. plan to place in operation additional dredge units as soon as more labor becomes available.

★New Almaden Corporation shut down its quicksilver property, the famous New Almaden mine, near San Jose, Santa Clara County, on Dec. 1, after more than four years of successful operation. Underground development work started in May, 1941, had to be abandoned because of labor shortage and inability to obtain needed equipment and materials. Operations were directed by C. N. Schuette, general manager, who was assisted by Bert Mitchell, superintendent.

★George G. Morse, of Denver, and Nevada associates are reported to be planning to reopen the Silverado mine, comprising 15 claims known as Silverado and Kentuck holdings in the Patterson mining district of Mono County. The mine, until its shutdown in 1938, was operated by Sierra Consolidated Mines Co., headed by J. J. Raskob, of New York. Though a part of the 150-ton flotation plant was dismantled in 1941, there is still considerable mine and milling equipment on the ground. Silver is the principal metal contained in the ore.

★Actual gold production is scheduled to be started soon at the Beame gold mine, near Pike City, Sierra County, also known as the Hartman property, where development work has been under way for some time. The mine is operated by the Atomic Corporation, V. L. Smith, president and general manager, under a purchase contract. The company also controls a quicksilver property near Hernandez, San Benito County, and placer holdings adjoining the Beame mine and in the Lincoln area of Placer County.

★The board of supervisors of Siskiyou County has announced that the recently enacted resoiling ordinance has been declared temporarily non-effective and will be held in abeyance, probably until a new measure has been completed by the state association of district attorneys applicable for statewide use wherever resoiling regulations are considered needed. Mining men opposed the ordinance, claiming that its provisions for resoiling would be ruinous to the industry.

★Thomas Divide Mining Co., of Nevada, has moved a dragline dredge to leased gold placers at Squirrel Gulch, on the East Fork of the Trinity River, Trinity County, and dredging operations are scheduled to start soon. The company also operates the Gold Bottom and Ophir gold mines near Trona, Inyo County.

# BATTERY-OPERATED Shuttle Cars Shorten Gathering Trips...

*Courtesy of Engineering & Mining Journal*

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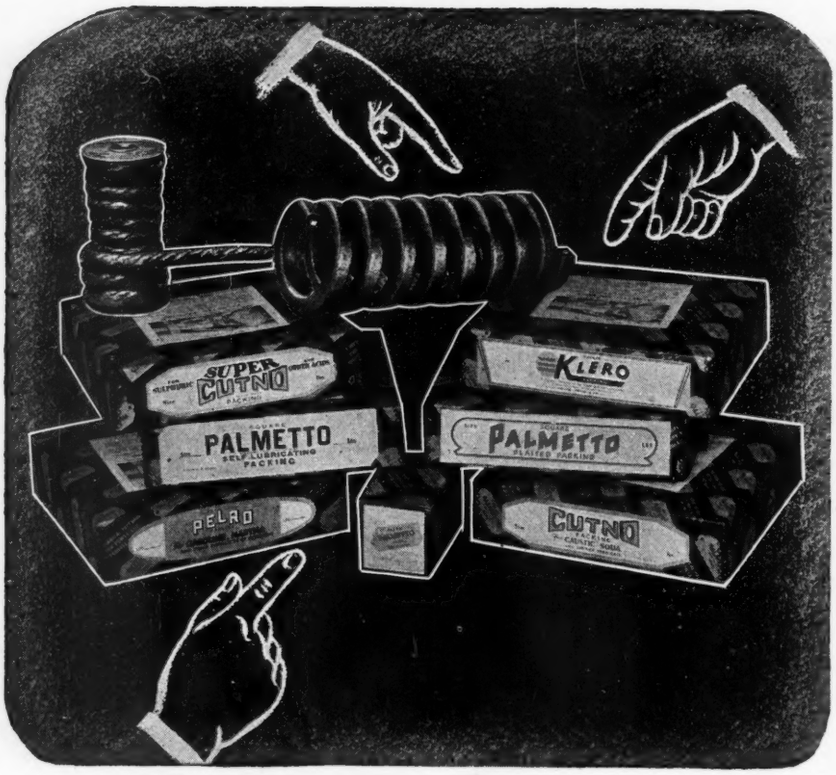
Edison
ALKALINE BATTERIES



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## MONTANA

### Anaconda workers vote in favor of strike—Gold dredging to be resumed

★Employees of the Anaconda Copper Mining Co. in Butte, Anaconda, and Great Falls voted 3,889 to 1,021 in favor of a strike in a Labor Relations Board-supervised election which was recently held in Seattle, Wash. The local unions at the three plants are members of the International Union of Mine, Mill, and Smelter Workers (CIO). The regional director of the National Labor Relations Board, Thomas T. Graham, Jr., stated that the strike vote, under provisions of the War Labor Disputes Act, was taken after the union contended the Anaconda Copper Mining Co. was unwilling to negotiate a union request for a general wage increase of $1.50 a day. The union has also asked 50c a day additional for underground workers in the Butte mines. John Clark, secretary of the union, said the result of the vote does not mean there is any immediate danger of a strike or that a walkout is mandatory. He declared that the strike vote will probbaly assure the miners that a government conciliator will enter the negotiations and mediate the dispute.

★The White Pine group owned by George Hoffman was recently leased to J. S. Walsh and associates. This property is in Jefferson County near Alhambra Springs. An adit on the Newburg property adjoining the White Pine claim has been reopened for a length of 700 ft. to the old face. Walsh plans to crosscut from this point to the White Pine vein, an estimated distance of 600 ft. Seven men are now employed at the mine to carry out the proposed development work. A power line has been completed and machinery will be installed as soon as possible.

★Winston Brothers' dredge, on the Prickly Pear near Jefferson City, is being overhauled, and the company expects to start operations soon. This dredge has not operated since October 1942, when it was closed down by L-208. It is estimated that the remaining gravel will sustain the operation for at least a year.

★The Nancy Lee mine, near Superior, has completed construction of a 100-ton selective flotation mill which is now producing lead and zinc concentrates. At present the entire mill tonnage is being produced by the Nancy Lee Mine, but the operators expect to purchase custom ore from nearby producers.

★Empire mine, one of the old producers of the Marysville district, has closed down for the winter months. The operators plan to resume production in the spring. The property has a 50-ton flotation mill which produces gold, silver, and lead concentrates.

★The Comet mine and mill, near Basin, was recently purchased by the Nugent Brothers, of Idaho. The new owners expect to move the 200-ton mill to the Coeur d'Alene district and erect it where they will operate one of their properties.

★The Victory gold mine, 8 miles northwest of Avon, Powell County, in the Ophir mining district, is now being operated by lessees. A recent 40-ton shipment netted the operators $80 per ton in gold.

★The famous Drumlummon mine, at Marysville, recently started operating a new 100-ton flotation mill. At present the mill treats about 30 tons of ore per day and produces 1½ tons of high-grade gold-silver-lead concentrates. The company plans to have the mill operating at full capacity in the near future.

★Joe Grismer, mining contractor from Coeur d'Alene district, recently started exploratory work in the Keystone district about 10 miles northwest of Superior. Property adjoining the Nancy Lee mine is being prospected by diamond drilling.

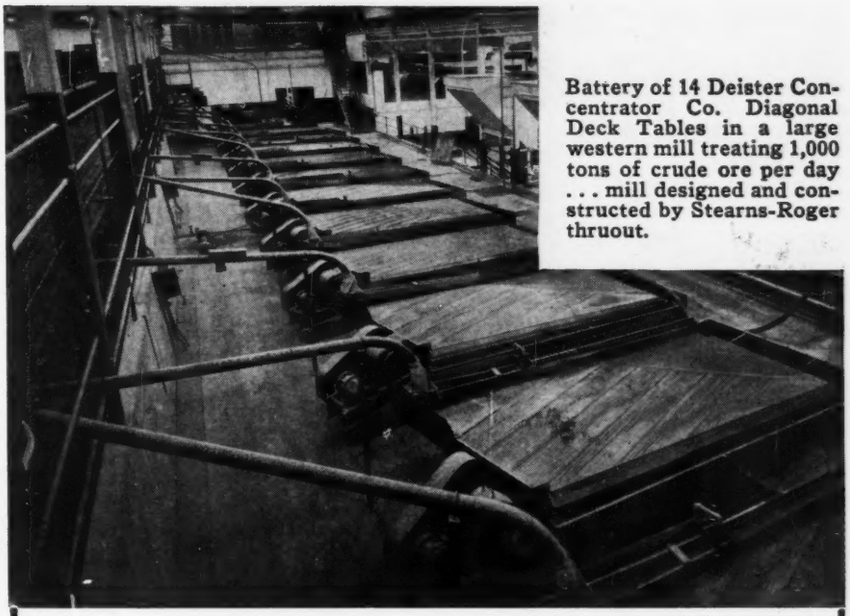
## WASHINGTON

### Claims are deeded to U. S. Smelting Co.—Mining association forms legal advisory committee

★That the United States Smelting, Refining & Mining Co., of Salt Lake City, still has in mind the construction of some smelting or other plant to handle the ores in northern Pend Orielle and Stevens counties is evidenced by the filing in Pend Oreille County of a deed to 19 claims, 8 miles north of Metaline Falls. The conveyance is from J. D. Crawford and wife, of Fairbanks, Alaska, to the smelting company. L. H. Hart, the company's chief engineer, has spent much time in Spokane and in the Metaline district investigating mining properties in those areas.

★"Metals will be more important in construction and reconstruction than they were in destruction," Donald A. Callahan, of Wallace, Idaho, recently told members of the Pacific Northwest Advisory Board in Spokane. "In the war reserves were depleted and inefficient operation and labor shortage increased costs. The industry must start all over again to create reserves, encourage development, and build efficent organization. It must seek new orebodies and must serve the Nation with that type of initiative it has always displayed. The mining industry has been hurt, but it is not disabled. It needs tariffs which will not subject the American metals market to the low production costs of other countries."

★Northwest Mining Association has established a legal advisory committee which will offer its services to mine

Battery of 14 Deister Concentrator Co. Diagonal Deck Tables in a large western mill treating 1,000 tons of crude ore per day . . . mill designed and constructed by Stearns-Roger thruout.

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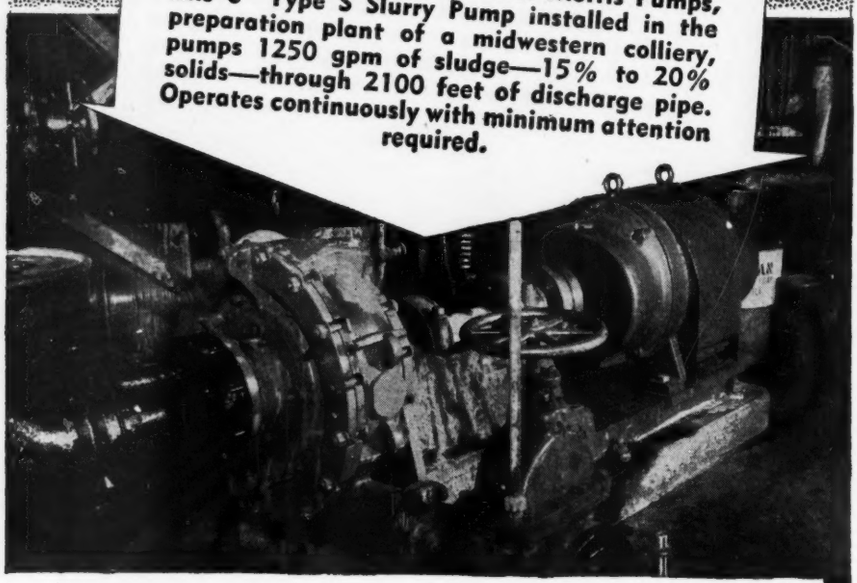

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## Washington (*Continued*)

operators, prospectors, brokers, and enterprises who find themselves hampered by "administrative law." It will have power to formulate and announce policies to be followed in dealing with appointive officials. Elmer E. Johnston, chairman of this committee, stated. "We have stopped asking the SEC for favors but are now depending on Congress for the relief we must have if mining is to be preserved," Mr. Johnston said.

★The RFC will pay about $500,000 a year to maintain the two Spokane aluminum plants in idleness, according to a statement made at a meeting of the Spokane Chamber of Commerce in November. In the meantime, Governor Mon C. Wallgren will be asked to provide that the State of Washington take over the two plants if no private firm is willing to do so.

President John M. Olin, of the Olin Aluminum Industries, Inc., of East Alton, Ill., says the company's plant at Tacoma will be closed because the future of commercial aluminum is too uncertain. Governor Wallgren says the State will use aluminum license plates in 1947. He says the cost will be about a cent more than steel plates but that savings in expense will result from less postage and freight rates.

## IDAHO

### Mining companies protest Springston dam project—U.S.G.S. petitioned to map area east of "silver belt"

★Fifty-eight mining companies of the Coeur d'Alene mining district joined in presenting a protest resolution in writing to Col. Conrad P. Hardy, district engineer in charge of the construction of a proposed dam across the Coeur d'Alene River at Springston, Idaho, and which would flood a large acreage of mining territory in this area. In their bill of protest, which was presented at a public hearing in Coeur d'Alene City on Nov. 20, the mining companies gave reasons why this dam should not be constructed.

The greatest danger the dam holds for the district, the complaint states, is the flooding of the Osburn fault. "This hazard," the complaint sets forth, "is so great in the minds of those who are in charge of the mining operations of the Coeur d'Alene district that they instructed their geologists to make a special investigation to determine the effects of this superimposed body of water." These geological reports will be presented to the government authorities in detail.

★Mining interests of the Coeur d'Alene district are petitioning the United States Geological Survey to study and map a long neglected section of the district south and east of Wallace.

This section lies south of the Osborn fault and extends from Placer Creek, in Wallace, to the Montana state line east of Mullan, a distance of about 12 miles.

That part of the district south of the Osburn fault and southwest of Wallace, known as the "silver belt," was studied and mapped several years ago by Phil Shenon, noted geologist, now connected with the U.S.G.S. Mr. Shenon's study of this section of the district extended as far as Placer Creek, in the city limits of Wallace, and stopped at the Placer Creek fault. East of this fault the surface mineralization is in evidence. Numerous veins show large siderite iron outcrops containing chalcopyrite and other copper minerals and some galena. No deep development has ever been attempted in this belt except at the Atlas property, at Mullan, where a four-compartment shaft has been put down on the north leg of the mineralized zone to a depth of 800 ft. below surface water level. Development on the 800 level shows lenses of milling-grade galena ore together with spatterings of gray copper. It was originally planned to sink a 1,600-ft. shaft, but the war prevented the work.

★Officials of the Silver Syndicate Mining Co. report that the orebody recently opened by the Sunshine Mining Co. in what is known as the "Rambo" area in Silver Syndicate ground, has now been drifted on for a distance of more than 200 ft. and shows a minimum width of 3½ ft. to a maximum of 12 ft. The discovery was made on the 3,700-ft. level of the mine, 1,000 ft. below sea level and has a silver content ranging from one to four oz. of silver to each percent of lead. The ore is strictly silver-lead, and minerun muck will average about 28 oz. in silver and 22 percent lead. The property is jointly and equally owned by Silver Syndicate and Sunshine, and is operated wholly by the Sunshine company.

★The Sunset Minerals Co., sponsored by Seattle people, came into the Coeur d'Alene district two years ago and purchased the Liberal King mine, on Pine Creek. The company immediately erected and equipped a modern 200-ton flotation mill, and started successfully treating a complex zinc-lead ore on which other operators and mills had failed. Source of the ore is from a blind vein in the Liberal King shaft at a depth of 1,000 ft. This orebody has been drifted on for 680 ft. in length and, according to Arthur Lakes, consulting engineer and geologist, the northwest portion of the vein contains good values, varying from 2 to 14 ft. wide. Sample map and records of 10,350 tons milled from January to September, 1945, indicate average values per ton of 8 percent zinc, 4 percent lead, and 0.7 oz. of silver per ton, with some copper and gold. Forty-six men are currently employed at the mine.

★Several years ago the mining companies of the Coeur d'Alene district

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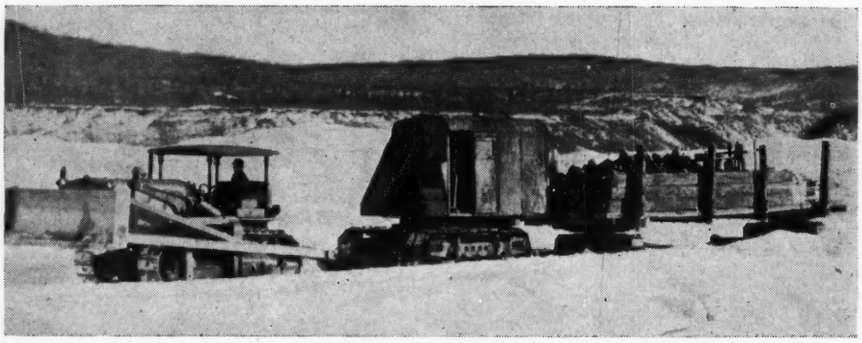


**TRACTOR TRAIN as it started out on a 310-mile trip to the South Fork of the Koyukuk River. A ¾-yd. dragline is shown mounted on the runners. Alaska Photo Shop.**

## Idaho *(continued)*

installed a dredge at Cataldo, on the Coeur d'Alene River, to prevent mineral tailings from washing into Coeur d'Alene Lake and, since 1932, the dredge has moved over 17,000,000 tons of material from the river channel and impounded it on adjacent low-lying territory, where it is safe from removal by the waters of the river. This amount of material is about double the actual tonnage of tailings deposited in upper reaches of the river from mining operations.

★The following companies in the Coeur d'Alene district have declared dividends recently: Tamarack & Custer Consolidated Mining Co., 2c per share payable Dec. 24; Sherman Lead Mining Co., 1½c per share payable Dec. 24; Hecla Mining Co., fourth quarterly dividend, 25c per share payable Dec. 10; and the Federal Mining & Smelting Co., fourth quarterly dividend, 75c per share on outstanding common stock.

★The last Idaho Legislature appropriated $100,000 for the purpose of research into the possibilities of the State's undeveloped natural resources. The University of Idaho is in general charge of the program, but it will not be merely conducted in campus laboratories; rather, the whole state is to be the laboratory, with mining, farming, and industry as the test tubes and Idaho's natural wealth as the ingredients.

## ALASKA

### Alaska-Juneau requests payment for waste removed by Army—Winter road completed to Fortymile district

★Alaska Juneau Mining Co. is pressing a claim for $200,000 against the Government for waste rock which was obtained from the company's concentrator and used by Army engineers for fills at the sub-port at Juneau. The War Department claims that when arrangements were made to secure the rock, nothing was said about payment for it, and that disposition of the rock actually spares the company the usual cost of removing it. G. A. Norris, of San Francisco, president of Alaska Juneau, and J. W. Williams, manager, supported H. L. Faulkner, attorney for the company, in presenting the case in Washington, D. C. Delegate E. L. Bartlett introduced a bill in Congress last spring to provide payment by the Government of $200,000. The War Department reported unfavorably on the bill.

★Albert Hudson has kept the road open between Fairbanks and Livengood by trucking oil to Livengood Placers for large-scale operations next spring, when 300 men will be employed at the mine.

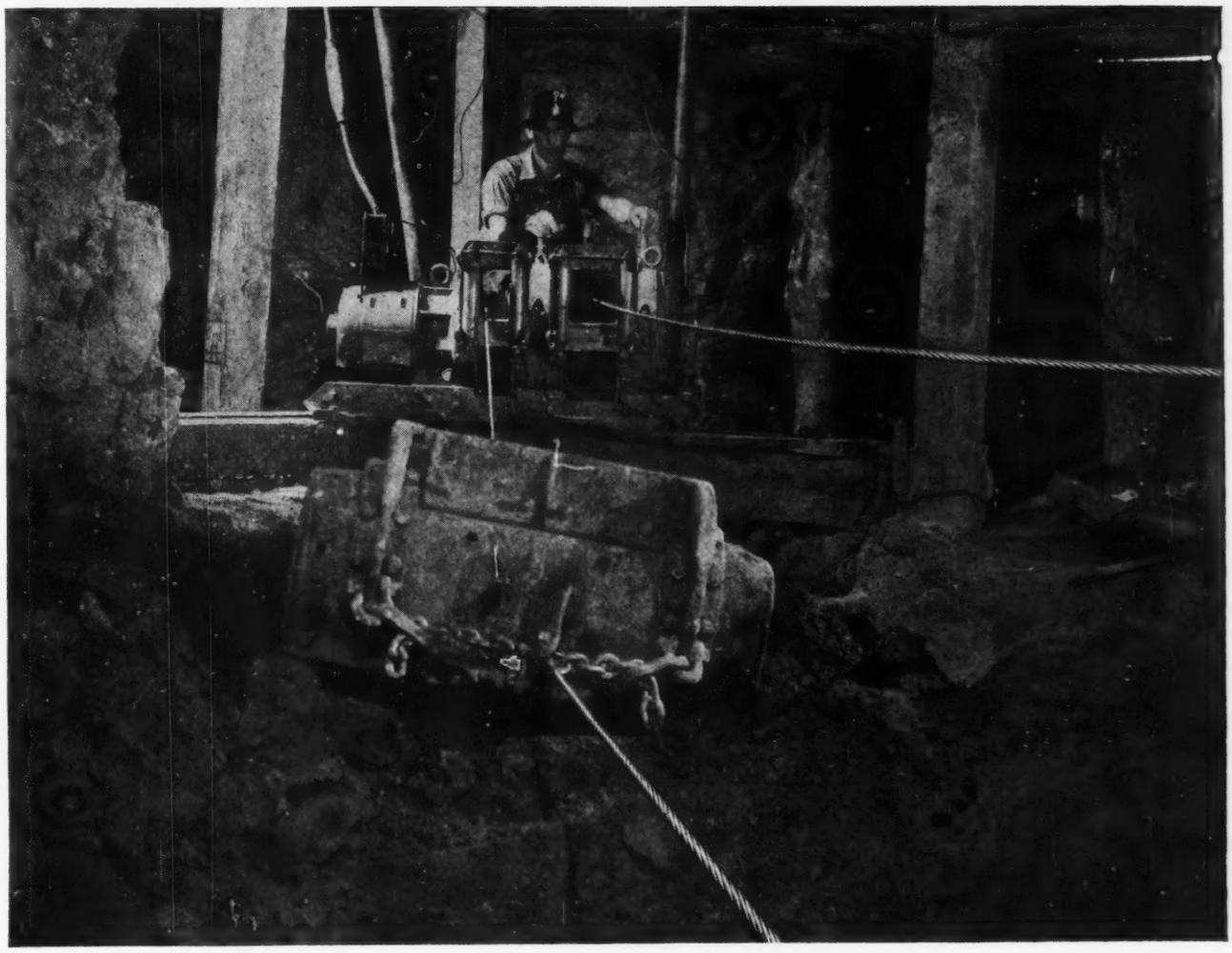
★Purchase of the Ben Accord group on Bitter Creek, in the Hyder district, is being considered by Montreal interests, according to J. O. LeFrancois. If the sale goes through, expenditures of $150,000 will be made for development and equipment next spring. Mr. LeFrancois says that the present owners will develop the property further if the sale is not made. Work on the property was stopped in 1942.

★The new gold strike at the mouth of the Beaulieu River, at Hearne Lake, 40 miles east of Yellowknife, is attracting interest in Alaska. Ore samples show from 1 to 9 oz. of gold per ton.

★By Dec. 1, 75 miles of winter road was completed, leading into the Fortymile district, by the Alaska Road Commission. The end of the road is 25 miles from Chicken, which can be reached by traveling over smooth ice of the river. The road starts from the Alaska Highway above Tok Junction from the north bank of the Tanana River. Several cats and other placer mining equipment will be taken into the district for operations the coming season.

★Northland Mines, Inc., a new company to be incorporated in Alaska, has taken an option on the property of the South Fork Mining Co. Several miles of placer ground on the South Fork of the Koyukuk River in the Wiseman area are involved in the transaction. The corporation is composed of Alaska and Seattle people, including Glenn Carrington, Andrew Nerland, G. A. Gustafson, and Jack Chandler, of Fairbanks, and Gil. Skinner and Ray Anderson, of Seattle.

The property has been operated by



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**AMERICAN**
**BRATTICE CLOTH CORP.**
**WARSAW - INDIANA**

## Alaska *(continued)*

the South Fork Mining Co. this past season with dragline and bulldozer equipment and bedrock sluice boxes. About 150,000 sq. ft. of bedrock was cleaned, and the recovery was better than had been indicated by drilling. Many supplies were freighted from Fairbanks and Stevens Village to the South Fork last winter by tractor train. This winter, oil and supplies will be freighted 120 miles from Stevens Village to the property. Freighting by tractor train has cut the freight rates from Seattle from $250 per ton to $75 per ton. If the option is exercised by the Northland Mines, Inc., the members have declared their intention of operating next season with draglines and tractors and later of installing a dredge on the property.

★Andy Schwaesdall has sold his interest in mining property on Myrtle Creek, tributary of the Middle Fork of the Koyukuk, together with leases and options on adjacent mining ground, to his partner, John Repo, for $78,000.

# CANADA

### Mining industry is recovering from labor and material shortages—Adjusted silver price stimulates properties in British Columbia

★A year-end appraisal of the mining industry of Canada indicates steady recovery from war restrictions on materials and the severe shortage of labor. Steady improvement in the number of workers available has been evident since November. In many districts, the acute housing problem has become more serious, particularly in such centers as Val d'Or and Rouyn-Noranda. Producing mines report labor shortages of from 50 to 400 men. Many new contracts have been let for shaft sinking across the gold belts of Ontario and Quebec. Properties where shaft sinking is in progress will require underground crews in the near future. Diamond drilling continues on a large scale, with activity pushing out into Tiblemont and Ligneris townships, in Quebec, and to other areas beyond those camps where exploratory work has been active for the past two years.

★The dividend record of the Canadian mining industry, as compiled by *The Northern Miner*, shows a further reduction for the past year, at $75,800,000. This is slightly lower than the total paid in 1944 and compares with the all-time record of $108,561,585 in 1941. Purdy Mica Mines and Belleterre Quebec Mines were added to the list of dividend payers, and nine companies made no disbursement in 1945. No change was made in the dividend declarations of 30 mining companies; 22 operators made payments on a reduced basis.

★Wartime Prices and Trade Board announced, early in December, that small producers will be allowed the U. S. price for foreign-mined silver. The Canadian ceiling price of 40c. an ounce will remain in effect for half the Canadian-refined silver, which will be reserved for domestic consumption. The remainder of the Canadian silver produced is to be exported at the higher price. This replaces the price of 56c. (Canadian) previously in effect. Canada's silver output in 1944 amounted to 13,627,000 oz., of which 11,355,000 oz. came from Consolidated Smelters, Hudson Bay, International Nickel, and Noranda. Concentrates are shipped to the United States by Golden Manitou, Berens River, and Base Metals, which receive the U. S. price and are not affected by the new Ottawa order.

## QUEBEC

★Underground work at Astoria Quebec Mines is advancing at the rate of about 500 ft. a month, according to a report by the mine manager, T. G. Woodcock. Results have proved to be better than indications of diamond-drill holes. All but 20 ft. in the 185 ft. of new advance on the 400-ft. level was in vein material of greater than drift width, for which face sampling gave a gold content of about $6 a ton.

★East Malartic Mines continues to operate well below the capacity of its 1,500-ton mill. A new incline shaft is being put down and an extensive development program is in progress. The cost is to be written off at a rate of 25c. a ton on the ore to be developed on the new levels. Gold recovery is reported to average about $6 a ton. D. M. MacLean is mine manager.

★Large-scale development has been undertaken by Malartic Goldfields to open lower horizons from the No. 2 shaft. The extensive ore tonnage indicated by previous work made it apparent that mill expansion to 1,500 tons a day would be necessary if the tonnage is confirmed by underground work. Dr. Robert Halet is mine manager.

★Diamond drilling is in progress on the property of Randona Quebec Gold Mines, of which M. J. Boylen is president. Indications of gold ore have been secured along a fault zone in the valley of Area Creek. This structure has an assumed length of half a mile across the property.

★Central Cadillac Mines has purchased the property of the adjoining Wood Cadillac Mines, equipped with a 200-ton mill. The mine workings are being dewatered and surface and underground diamond drilling is in progress, on the Central holdings. Vertical holes are being put down to test an extension of the orebody formerly developed in the Central mine in a section between the North side of the Cadillac shear and iron formation. It is reported that

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# 605

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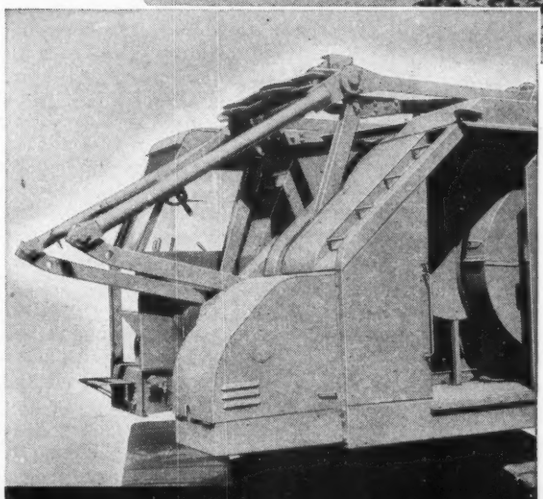

*High A-Frame folds up like this after two pins are removed.*

***Because*** **power raises and lowers the High A-Frame fast, you cut moving expenses every time you ship the new Koehring 30-ton crane by rail, every time you truck it through a highway underpass, every time you move it under overhead obstructions on the job. In just a few minutes you reduce overhead clearance from 18'-8" to 12'-9".**

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**Raising or lowering the 605 High A-Frame is simple, safe. Remove 2 pins and the High A-Frame is ready for lowering by power. A cable attached to the hoist-drum controls lowering speed. The same cable raises the 605 High A-Frame back into position. No danger of over-pulling because the High A-Frame comes to a definite stop when fully raised.**

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**Boom suspension cables stay in place on short moves. Because the frame is strong, the Koehring 605 crane may be operated with the High A-Frame in any lowered position.**

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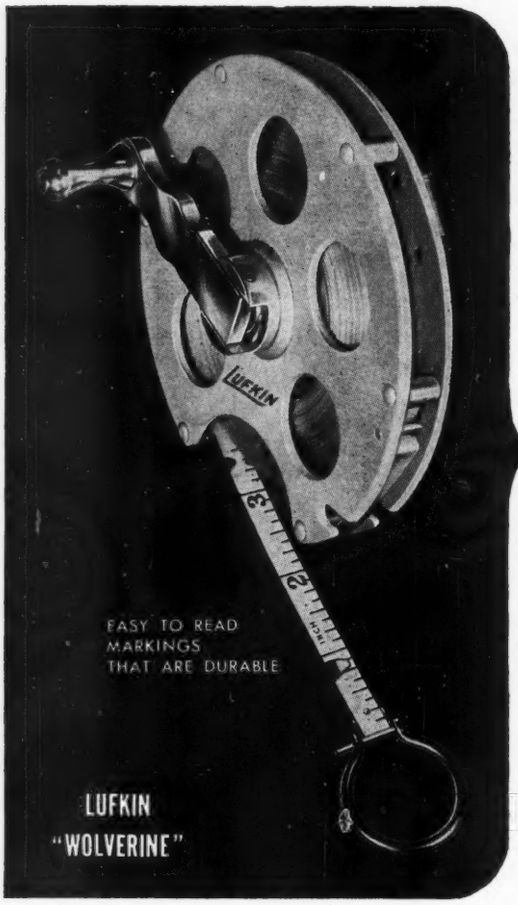


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## Canada *(Continued)*

the first hole from surface intersected values up to $34.65 a ton in gold across 2.3 ft. One core length of 5.2 ft. assayed $14.08 a ton. Plans have been announced for resuming production at an early date at both the Central and Wood properties.

★Charles LaBine, president of Shawkey (1945) Mines, Ltd., reports that dewatering of the underground workings on the property of the former Shawkey Gold Mining Co. is expected to be completed in March. After the 725-ft. shaft is dry, it is planned to start a development program to extend the 12,000 ft. of old workings on six levels. A new compressor and other equipment have been installed. Electric power was made available on Dec. 15. J. R. Shawkey is mine manager.

★V. H. Emery, president of Northern Canada Mines, has reported that his company is participating in options to purchase the properties of Gan Copper Mines and Algray Mines (Quebec), in the West section of Beauchastel Township. Following magnetometer surveys, these properties were remapped, and diamond drilling is now in progress to test the structure that is associated with widespread dalmatianite alteration.

### ONTARIO

★Berens River Mines, in the Patricia district 10 miles east of Favourable Lake and accessible by winter road 180 miles from Lake Winnipeg, Manitoba, has benefited from the new price of silver to the extent of about $200,000 a year. Production for 1944 amounted to 316,600 oz., in addition to 506,232 lb. lead, 460,610 lb. zinc, and 10,031 oz. gold, the ore grade averaging $14.42 per ton. The president, John Drybrough, reports satisfactory progress in depth development on the 1,850-ft. level. The property is equipped with a 250-ton cyanide and flotation mill and a zinc flotation plant.

★The Porcupine property of Bonetal Gold Mines is being tested by a drift put out from the Hallnor mine on the 2,160 level, under the direction of James & Buffam, consulting engineers. This heading has been advanced 600 ft. into Bonetal ground, and diamond drill exploration is in progress along the Keewatin-Temiscaming contact. New ore has been located near this contact in the adjoining Hallnor workings. Drill holes will test the contact at 500 ft. below the station. The Bonetal production is now secured from the upper 512 ft. of the property, and present exploratory work is preliminary to deepening the shaft. Bonetal ore is treated by the mill on the Broulan Porcupine property. Walter F. Brown is mine manager and Bert Lang is president of Bonetal.

★Broulan Porcupine Mines reports that enlarging the working force made possible production increases in the last three months of 1945. In October, output advanced 45 percent. For the first ten months, there was a 14 percent decline in tonnage milled, compared with the same period a year ago, and grade dropped 20 percent to an average of $6.50 a ton. At the same time, working costs were up only 1 percent. Broulan holds a stock interest in Bonetal, Porcupine Reef, Goldhawk, and other properties along the east extension of the Porcupine break. Dr. W. F. James is vice president.

★Golden Gate Mining Co., at Swastika, west of the main Kirkland Lake camp, has reopened the property. The president, W. J. Lawson, reports exploratory work in progress on three levels. Drifting on the 100-ft. level is for the purpose of testing ground where $66.15 across 4 ft. was secured in drill core several years ago. On the 300 level, a drift is being extended 800 ft. to test sections where diamond drilling disclosed gold values of $16.80 over a 3-ft. width and $29.40 over 7 ft. A long exploratory drive on the 400 level will be put out to the north toward the main mine workings. Favorable results from this program will lead to reopening the 150-ton mill, which only requires a new crusher. The property is developed by an incline shaft to 350 ft. and a 1,000-ft. vertical shaft.

### BRITISH COLUMBIA

★Assurance given by the Dominion Government that the world price for silver, 71.111c. (U. S.) would be extended to the smaller Canadian producers has been received with satisfaction by the mining industry of British Columbia. Failure to establish the same price for the larger producers, notably The Consolidated Mining & Smelting Company of Canada, Ltd., has caused some concern as has been expressed in the following statement of the Hon. E. C. Carson, Minister of Mines:

"I am sure the increased price for silver produced by the smaller operators in British Columbia, as provided in accordance with a recent decision of the Federal Government, will be appreciated. I feel, however, that there is discrimination in that all silver producers have not the opportunity of participating in this increase."

News of the extension of the world price to Canadian producers was followed by announcements of the reopening of the Silver Ridge and Wellington mines, in the Slocan mining division. Other producers in the "Silvery" Slocan to be favorably affected are Western Exploration Co., Ltd., operating the Mammoth, Standard, and Enterprise mines, at Silverton; the Santiago Mines, Ltd., operating the Bosun mine, at Sandon; and the Zincton Mines, Ltd., operating the Lucky


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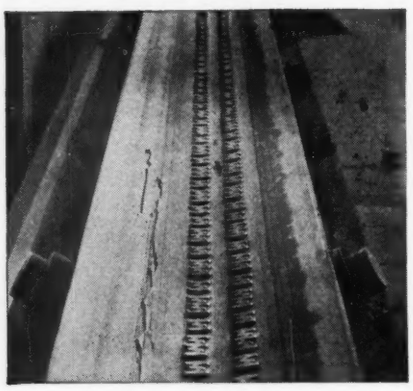

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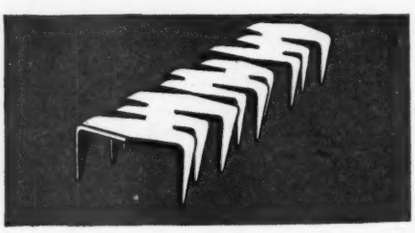

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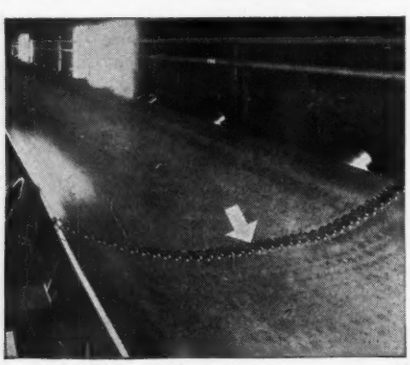

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## Canada (*continued*)

Jim mine, at Zincton. It is possible that Kootenay Belle Gold Mines, Ltd., which had all but abandoned its unsuccessful lead-zinc mining operation at the Whitewater mine, may seek to recover silver from the potential deposits at higher levels.

In the Greenwood mining division, Highland-Bell, Ltd., the Province's sole straight silver producer, will benefit materially. R. B. Staples, managing director, states the edict will have the effect of changing the destination of ore shipments from the Tacoma smelter to Trail. During the past year or so it was necessary to ship to the United States smelter to obtain the higher price for silver, but now that the price will be paid on a parity by the Canadian smelter, the more attractive freight rates to the latter will be the deciding factor.

There is a possibility of a revival of activity at the Duthie mine, at Smithers, in the Omineca mining division. This was a substantial producer prior to 1930. Several other potential silver producers exist in the district. Surface assays in the Whitesail Lake area, most spectacular gold-discovery section of recent years, carry an average of 10 oz. to the ton in silver.

Producers and prospects alike in the Portland Canal division will benefit. A spokesman for Silbak Premier Mines, Ltd., states they are not affected by the announcement, as they have always shipped to Tacoma and are outside the pool. Furthermore, in recent years the silver content of the ore has fallen to some degree. The Porter-Idaho and the Prosperity, important silver producers prior to 1930, may return to production as a result of the improved price of the metal. Already plans are under way for the incorporation of a new company to operate the Silverado mine, adjoining the Prosperity.

★Taku River Gold Mines, Ltd., Atlin mining division, has acquired all outstanding shares of Polaris-Taku Mining Co., Ltd., thus obtaining complete ownership of the Polaris-Taku mine.

★Berton Gold Mines, Ltd., has been incorporated to develop 21 claims at the head of Herbert Arm, on the west coast of Vancouver Island. To date more than $125,000 has been spent in exploration and development and some high-grade ore has been shipped. It is hoped to bring the property into early production. B. W. W. McDougall is consulting engineer.

★An order-in-council passed last month at Victoria grants Vananda Mining Co., Ltd., and Industrial Metals Mining Co., Ltd., previously registered as restricted to mining of gold and silver on Texada Island, the right "to prospect for and mine all minerals in the said claims."

★A marked improvement in the labor-shortage situation has been noted by Britannia Mining & Smelting Co., Ltd., with an increase of more than 50 men in the underground complement during the past two months.

★November production of Cariboo Gold Quartz Mining Co., Ltd., was 1,345 oz. gold, valued at $51,783, from 3,762 tons, averaging 0.36 oz. gold per ton. The underground crew has risen in numbers from 60 to 150.

★International Mining Corporation (Canada), Ltd., has taken an option on the Oxide lead-zinc property, five miles east of Ymir, in the Nelson mining division. Diamond drilling is proposed.

★Premier Border Gold Mining Co., Ltd., and Quatsino Copper-Gold, Ltd., have agreed with Harold Lakes, Nelson mining engineer, jointly associated, to provide funds for the development of the Fern mine, in the Nelson mining division. Underground work will be done to reach ore indicated by diamond drilling.

★Gold Belt Mining Co., Ltd., has commenced development of its mine in the Sheep Creek district with a view to resuming production as soon as possible. F. W. Reger, superintendent, states that an 8,000-ft. crosscut will be driven northerly on the 600 level to the boundary between Gold Belt and Reno, and a raise which is now 450 ft. below the 600 level will be completed to connect the 600 level with the 1,100 level. Construction of a new camp on the 600 level has been completed.

★Thirty men are currently employed at Bayonne Consolidated Mines, Ltd., and the results of development work have been encouraging. Resumption of production is planned for early in the new year.

## MANITOBA

★Central Manitoba Mines, Ltd., report for the year ended Aug. 31, 1945, gives details of an active exploration program. On a group of claims staked and optioned west of Rice Lake, a total of 3,702 ft. of drilling was done in six holes during 1944. No intersections of commercial grade were obtained, but the occurrence is deemed to warrant further drilling when equipment is available. Partnership arrangements with two other organizations for exploratory work have been continued. A large block of claims has been acquired at Wallace Lake by staking and option. Maximum assays obtained were 0.28 oz. across 14 in. and 0.24 oz. across 30 in. Further investigation will be carried out. In the Island Lake area, Central Manitoba is interested with three other companies in three groups comprising 79 claims. A detailed geological map has been completed, and on this basis a drilling program will be conducted this winter.

★Cuprus Mines, Ltd., subsidiary of

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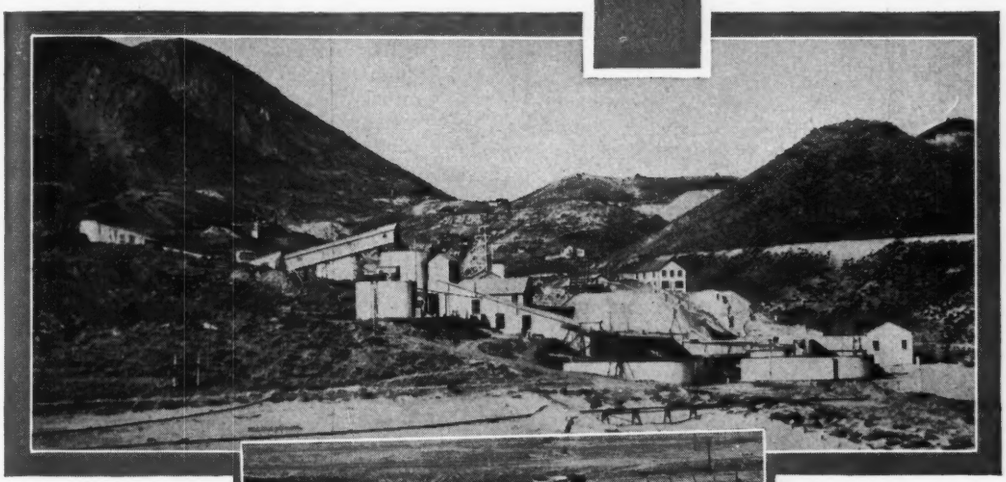

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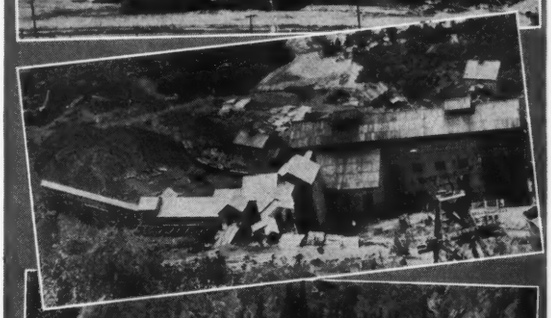

Mill of Telluride Mines, Inc., Telluride, Colorado.

Mill of Shenandoah-Dives Mining Co., Silverton, Colorado.

Virginia Mine at Eveleth, Minn., operated by Snyder Mining Co. of Duluth, Minnesota.

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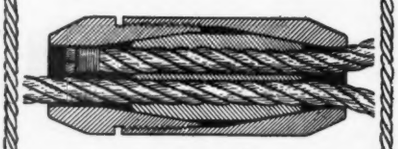

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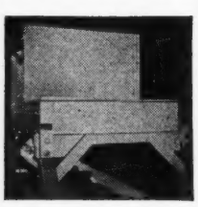

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## Canada *(continued)*

Hudson Bay Exploration & Development Co., Ltd., have begun the construction of a power line and road to their property, 8 miles southeast of Flin Flon. Movement of plant equipment from the Mandy mine to the site of the new development is under way.

★God's Lake Gold Mines, Ltd., announces that further exploration will be continued this winter under the direction of F. A. Baker, manager when the property was producing. New enterprises which the company has assisted in financing include Dominion Magnesium, Wekusko Consolidated, Bevcourt Gold Mines, and Regcourt Gold Mines.

★Eldon L. Brown, president and general manager, Sherritt Gordon Mines, Ltd., reports that company prospectors have located two groups of claims in the Granville Lake area, northern Manitoba. Material of ore grade has not been discovered to date, but further work appears justified.

In the third quarter of 1945 Sherritt Gordon treated 150,442 tons, an average of 2,499 tons per day for the 61 days on which the mill operated. Profits were $222,310 after taxes but without provision for depreciation or deferred development. Michipicoten Iron Mines, Ltd., in which Sherritt Gordon holds a 60 percent interest, started production in September at the Josephine mine, in Ontario. An eventual output of 1,200 tons per day is anticipated.

★Squall Lake Gold Mines, Ltd., has been organized as a subsidiary of Wekusko Consolidated Mines, Ltd., to develop 46 claims situated a few miles north of the Howe Sound Nor-Acme property.

★The management of San Antonio Gold Mines, Ltd., announces that the new winze planned from the 16th level will be designated as No. 4 winze and will be located 1,000 ft. southeast of No. 3 winze. Probably six new levels at intervals of 150 ft. will be established.

The No. 50 vein exposed on the 16th level has a length of 700 ft. of ¼ to ⅓ oz. ore averaging 20 to 25 ft. in width. Diamond drilling and other development have traced this vein from the 13th to the projected 18th level. Altogether six orebodies are indicated on the 16th level, and normal development is anticipated in the near future to prove their extent.

★Gilbert A. La Bine announces that work will start immediately on reopening Ogama-Rockland Gold Mines, Ltd., situated 8 miles west of the Gunnar mine. A contract for power has been signed. The service will be taken from a power transmission line crossing the property. The Gunnar mining plant will be transported to the Ogama property, consisting of ten mining claims and fractions.

## MEXICO

### Silver miners call strike on Jan. 1, affecting nearly 40,000 workers and 32 companies

★The strike which 33 silver sections of the national miners union had planned to call on Dec. 17 unless 32 silver mining companies and five refineries granted 40 percent pay increases was postponed until Dec. 31 to permit further conciliatory conversations.

However, further negotiations were unsuccessful, and on Jan. 1 a strike was called which affected some 40,000 mine and smelter workers at Mexican properties recovering silver. Most producers of lead and zinc were also affected by the move. Mine owners contended that because of inroads which taxes were making in mine profits, a 40 percent wage raise was unreasonable, and in some circles it was stated that even a 20 percent wage increase was impossible under current conditions.

★Arrangements for working low-grade mines that were abandoned during the depression, in San Juan de Guadalupe municipality, Durango, were hailed by the Mexican press as demonstrating that exploiting low grade properties is a good business. These views are not taken seriously by mining executives. Though applauding the effort, the executives opine that to be really a good business, the operation of low-grade mines must be conducted on a large scale.

★Several gold and silver prospects in the Otaez and San Dimas districts of Durango are being worked by Raul H. Damm, Durango City, who owns La Aurora y Ampliacion de la Aurora. He is soon to install a 25-ton mill and is to organize a company for the development of his properties.

★Several employers' organizations have filed suit with the Federal Supreme Court to have declared unconstitutional the recently announced extension by the wages section of the Labor Ministry of the law enacted on Oct. 1, 1943, that made obligatory the raising of pay of all contracted help in Mexico earning up to 10 pesos ($2.10). The employers argue that, as this was a wartime emergency measure, it is now unconstitutional because a presidential decree officially declared Mexico's state of war ended last Sept. 30. The obligatory raise was scaled from 50 down to 5 percent, with the higher benefits for workers earning the lowest wages.

Many mining enterprises accepted this measure. But others did not. Some were excused from obeying it when they proved to the Government that their economic condition made it impossible for them to do so. Still others sought court injunctions against

IMPORTANT new designs and improvements are rarely the results of good luck; most of them come the hard way, from intensive research by skilled engineers working with ample facilities and a thorough knowledge of the field. That's especially true of mining shovel design, where so much depends on constant close contact with current field problems, on engineers with the "know how" to develop practical ways to solve those problems, on manufacturing facilities extensive enough to permit really progressive design. To these must be added an ever-present determination to build the finest possible equipment; to consider thoroughly suggestions and recommendations from the men on the job, with the aim of steady improvement.

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## Mexico (*Continued*)

complying the measure, with varying success. The high court is expected to act on the employers' suit soon.

★Construction of a mill and the installation of a power plant are soon to be started by the Cia. Minera Wavaal, S. A., at its properties in Durango. The properties have been good producers of gold since 1940. The enterprise is managed by Mario Fernandez, of Apartado Postal No. 19, San Miguel del Cantil, via Tepehuanes, Durango.

★Important copper sulphide orebodies have been encountered near Eureka, Sonora, by Metales de la Victoria, S. A., subsidiary of the American mining enterprise that functions in Arizona as the Emerald Isle Copper Co., and in Nevada as the Ely Gold & Manganese Co. The company expects good results from this sulphide ore discovery and has intensified its operations at the Eureka mines.

★Loans by the Federal Government have given new life to the Dos Carlos and San Rafael mining cooperatives, Pachuca, Hidalgo. Both are the first enterprises of the kind to be established in Mexico. They were founded by the Cardenas Government eight years ago and have frequently been in economic straits, particularly the San Rafael, which was recently forced to suspend operations. The Dos Carlos got a 650,000-peso ($140,000) loan and the San Rafael, one of 400,000 pesos. The Dos Carlos claims a membership of more than 3,000, and the San Rafael of about 900. The latter society has changed its administrative committee. Ing. Luis Espinosa is the society's new general manager.

★Improvement of mining conditions is reported for Sinaloa with the Contraestaca, El Rosario, San Vincente, Guadalupe de los Reyes, Tayolita, and Copala zones leading in this renewed activity. Better sea transportation facilities have induced several Sinaloa mining enterprises to ship through Mazatlan, the State's principal port, which has been improved. Shipping by sea has claimed the active interest of mining enterprises in Mexico not only because of the cheaper freight rates but in view of the increasing improvement in the volume and quality of maritime services to Mexico. These have already begun to relieve the overburdened railroads, particularly the National Railways, which is still struggling under freight congestion at several key centers. The Government, through the Marine Ministry, is pushing its program to improve ports. Results of that work have already done much for such key ore-handling ports as Tampico and Guaymas, Sonora, as well as Mazatlan.

★Rail freight rate increases of from 20 to 30 percent, which the Ministry of Communications and Public Works has tentatively approved, to become effective Jan. 1 and which directly affect mining, are being vigorously protested by organized shippers and industrialists, who declare these rate advances to be exorbitant. The ministry has replied that they are reasonable.

# PERU

### Higher silver prices expected to bolster mining—Cerro de Pasco purchases property

★The increase in the price of foreign silver in the United States from 45 to 71c per ounce has produced a general feeling of optimism in local mining circles. Silver shares went up several points the day the announcement was made, and a boom is in sight. To Peru, the world's fourth producer of silver, this increase in price of 26c per ounce is tremendously important. The mining industry has been suffering for the last two years from cancellations of ore-purchasing contracts. Those who invested in the development of strategic metal mines, such as tungsten, zinc, antimony, and molybdenum, found themselves in serious predicaments when purchases of their ores were either canceled or severely restricted. Now, with a good demand and high prices for silver and lead, it is expected that production will increase, both from operating concerns and from the development of numerous small properties.

Silver in Peru occurs in very complex ores, such as tetrahedrite, enargite, proustite, and argentite, always associated with galena, sphalerite, and chalcopyrite. A typical ore will carry about 15 oz. of silver, 0.08 oz. of gold, 2 per cent copper, 10 per cent lead, and 12 per cent zinc. At present these ores are treated by selective flotation, with good recoveries in the production of two, and often three, concentrates. So far, no silver ores in Peru have been amenable for straight cyanidation, mainly because of the presence of colloidal particles and cyanicides, such as copper, arsenic, and antimony.

★The San Juan de Lucanas mine, in Southern Peru, belonging to the Consorci Minero, has struck a rich pocket averaging 150 oz. of silver. Development is under way to determine the magnitude and value of this new shoot.

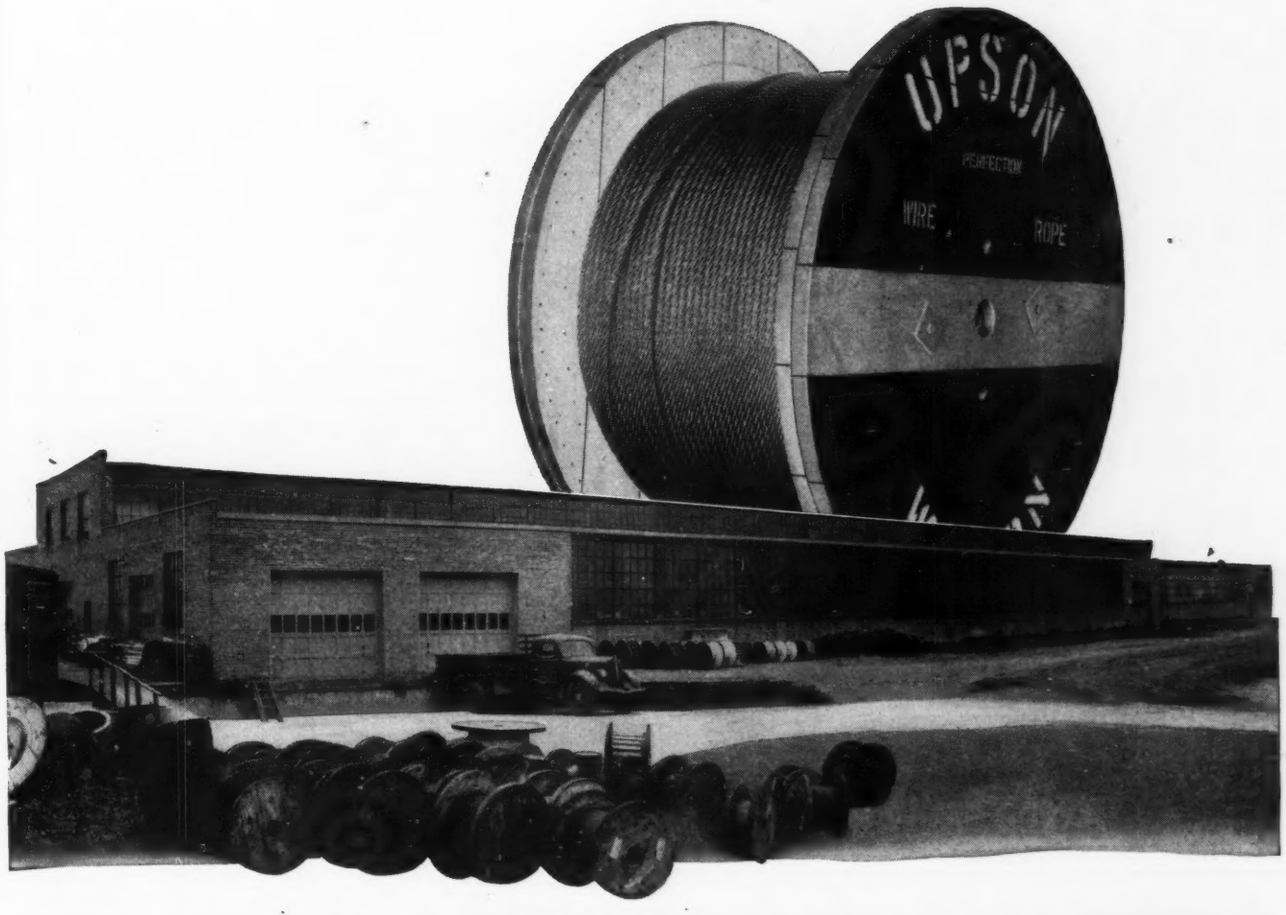
★The district of Milluachaqui, in the Department of La Libertad, about 50 miles inland from Trujillo, is undergoing development, with new important findings in sight. Northern Peru Mining & Smelting Co., a subsidiary of American Smelting & Refining Co., is working a narrow vein, said to contain an average of 30 to 40 oz. of silver and 0.3 to 0.4 oz. of gold. Ores are treated at the 60-ton concentrator, at Samne, 12 miles west of Milluachaqui. Another group, headed by the Calegari interests, is opening a new property, with a crosscut which has exposed a rich pocket of gold-silver ores. A small concentration plant is under project.

★Cerro de Pasco Copper Corporation has recently purchased the Raura property, near Oyón, about 60 miles west of Cerro de Pasco, at an altitude of over 15,000 ft. These mines belonged to Messrs. Luis Delgado and Domingo Sotil, and were studied in the last two years by Cerro de Pasco Copper Corporation, under option. Raura is said to have large reserves of copper, lead, and silver ores. Cerro is at present building a 20-mile automobile road from Oyón to the mines.

# BOLIVIA

### Tungsten output drops—Government asked to reduce taxes to offset lower metal prices—Expropriation is opposed

★With the ending of the war, it becomes increasingly difficult to market Bolivian tungsten. The industry, stimulated by the extraordinary demands for special armor steels, reached unprecedented levels in Bolivia; but, as happened after the first World War, mines are again closing down or reducing operations. In a market influenced by

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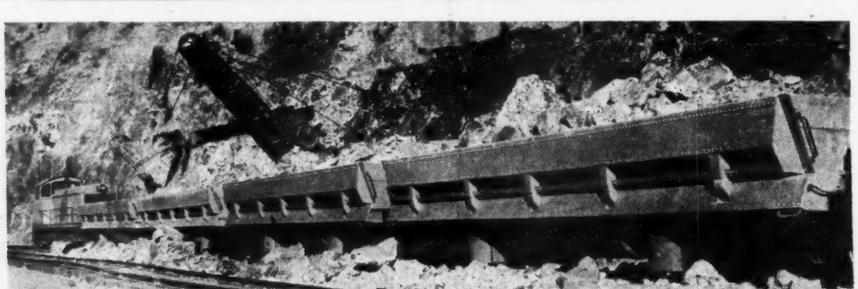

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## Bolivia *(continued)*

considerable stocks now in the hands of the manufacturers, the high cost and not very high grade of the Bolivian tungsten concentrates make it hard for domestic producers to compete with Chinese or other producers.

In a last effort to keep the tungsten mines open, the Bolivian Government has announced that it will reduce considerably the heavy tax on tungsten exports, but the general impression is that this policy will give scant results. The following table illustrates the effects of war on Bolivian tungsten production:

**Bolivian Tungsten Ore Exports**

| Year | Metric Tons of $WO_3$ Content |
|---|---|
| 1914 | 180 |
| 1917 | 2,320 |
| 1918 | 2,050 |
| 1920 | 430 |
| 1923-1925 | (*) |
| 1926 | 36 |
| 1940 | 2,510 |
| 1944 | 4,761 |

(*) No exports.

★In October, representatives of small miners associations of the nation met in Oruro. The decrease in the price of tin, tungsten, and antimony had caused the closing down of many small operations, and the congress decided that only a general reduction of costs could avert the closing of more mines. Thus, the congress asked the Government to reduce all taxes on exports and transportation, to relieve the operators of the heavy impositions created by social laws, and to give small mines in these and other matters a preferential treatment. A commission sent to visit President Villarroel returned to Oruro with the promise that the Government would attend to their claims.

★The Bolivian Tin & Tungsten Mines Corporation, of the Patiño group, has given notice that it intends to close the Huanuni mine, while a sink-and-float plant is being installed, which would take several months, forcing them to release the labor now employed. The inspectors of the Department of Labor report that the changes in the plant do not necessarily mean a complete shutdown, and that the company, complying with the law, has to give a 90-day notice, and that final decisions pertaining to the matter are up to the Ministry of Economy.

★It has been announced that the Santa Fe tin mine, by resolution of the Junta de Defense Economica (Committee of Economic Defense), will be expropriated and run under Banco Minero (an agency of the Bolivian Government). During recent years Empresa Minera Santa Fe has come to the front, and produced 738 metric tons of tin content in 1944. It belongs to Gustavo Eickemberg, a German subject. JDF decided to expropriate the property for that reason now. However, in the last years no similar step was taken, and Mr. Eickemberg was never included in the proclaimed lists of blocked sub-

jects either of the Government of Bolivia, the United States, or Great Britain. Furthermore, the U. S. Embassy in Bolivia and the British Legation have intimated that they are opposed to the measure. It is believed, therefore, that the expropriation will probably not go through.

## AFRICA

### South Africa's metal production for war reported—Transvaal mining costs increase

★Technical advisers of Libanon, a subsidiary of West Wits, recently recommended that production at a milling rate of 10,000 tons a month be resumed shortly. It was estimated that at least two years will be required to develop the necessary ore reserves and complete a reduction plant. During this period, sinking of No. 2 shaft would be completed and connection with No. 1 shaft would be made. Additional working capital required for this work would be approximately £2,500,000.

★Reserves of ore at New Modderfontein Gold Mining Co. no longer warrant the operation of two mills, according to a consulting engineer's report included in the annual report. Steps are being taken to close down the north mill and send all tonnage to the south plant. Monthly tonnage milled will be reduced to 90,000, it is estimated.

★The Department of Mines has released some information on South Africa's contribution of metals and minerals to the general war effort. Since 1940, ore bodies of suitable magnesite in the eastern Transvaal have supplied Britain with more than 19,000 tons. Britain also received 35,000 tons of high-grade hematite. The shortage of mercury necessary for munitions manufacture and gold mining industry in 1941 led to the development of a mercury mine in northern Transvaal, which produced £150,000 worth of mercury by the end of 1944. Production continues. The Union not only supplied its own needs, but those of Southern Rhodesia and India as well.

Other vital metals and minerals exported from 1940 to 1944 were: copper, 101,701 short tons; chrome, 810,487 tons; antimony, 11,563 tons; manganese, 958,183 tons; tungsten, 1,132 tons; amosite asbestos, 97,442 tons; Cape blue asbestos, 31,020 tons; corundum, 22,258 tons.

★Capacity of the crushing plant of Blyvooruitzicht Gold Mining Co. is being increased to 40,000 tons a month, and later this will be doubled. A report for the quarter ended Sept. 30, 1945, lists tons milled as 32,600 and cost per ton, 69s. 11d.

★Rhodesian Broken Hill Development Co. estimates that indicated ore re-


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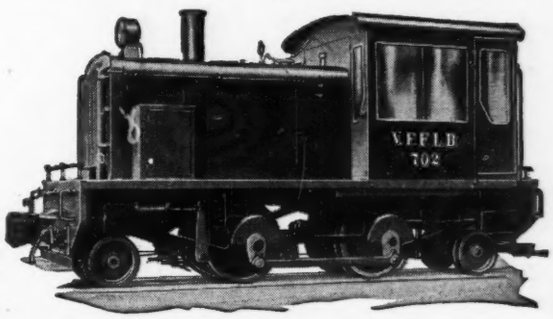

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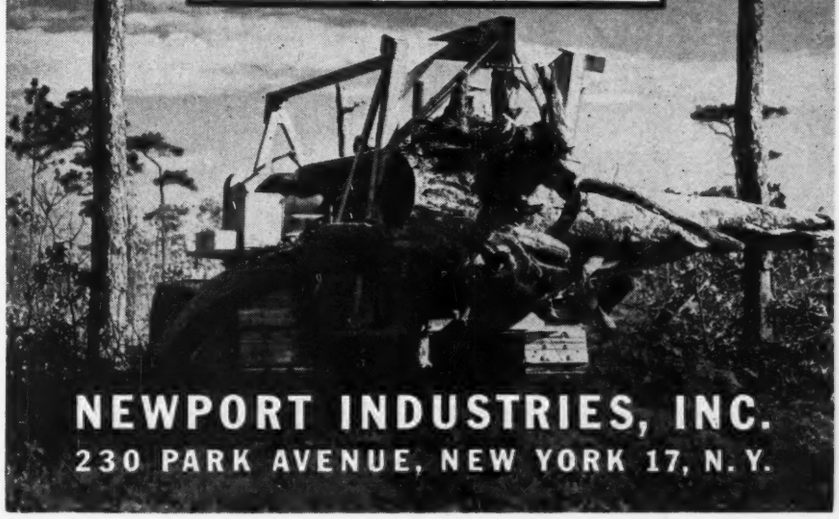

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## Africa (*continued*)

serves as of April 30, 1945, were as follows: Oxide ores, 2,212,000 tons averaging 23.6 percent zinc, 7.2 percent lead, and 0.86 percent $V_2O_5$; sulphide ores, 1,562,000 tons averaging 36.2 percent zinc, 23.4 percent lead, and 18.9 percent sulphur. It is emphasized that these are indicated ore reserves, and should not be regarded as proven tonnages.

★Southern Rhodesia's gold production shrunk from 814,000 oz. in 1939 to 600,000 oz. in 1944. The Rhodesian mining industry suffers from high costs of materials and is asking the Legislature to alleviate taxes to enable expanded mining activities. Producers numbered 702 in 1944, which is 872 less than in 1939. Most serious decrease in output was registered by the "large mines" group (mines producing more than 10,000 oz.). Two mines dropped out of that group in 1944.

★The Dalny claims in the Hartley district are stated to have an orebody with a known strike of 4.25 miles, the whole of which is either owned by, or under option to, the Dalny group of mines controlled by the Rhodesian Corporation and Falcon Mines, Ltd. The Corporation has also interests in Union properties which include Spaarwater, West Spaarwater, West Vlakfontein, and Witwatersrand Nigel.

★A new company registered in Pretoria last year has also taken an interest in mining in Rhodesia. It is the Anglo Rand Mining & Finance Corporation, Ltd. which acts as secretaries to the Beatrice Gold Mining Co. The latter has acquired the Empress gold mine, in the Fort Victoria district of Southern Rhodesia.

★Bushtick Mines (1934), Ltd., reports 16,500 tons milled in September, yielding 2,512 oz. gold. Ore reserves as of June 30, 1945, were estimated at 566,550 tons averaging 3.333 dwt.

★The total output of gold and other metals and minerals from Southern Rhodesia for August, 1945, amounted to £652,981, compared with £669,586 for the previous month of July. Production was as follows: gold, 47,666.25 oz., valued at £410,526; silver, 7,846.38 oz., valued at £768; and base metals and minerals, valued at £241,687.

★Tanganyika's gold exports for September totaled 6,813 oz., valued at £33,324, compared with 5,025 oz., valued at £24,826, in September, 1944. All the September output except 115 oz. was exported to South Africa.

★The Transvaal Chamber of Mines reports that working costs for gold mines during the first nine months of 1945 were £52,166,240, compared with £50,197,637 for the same period in 1944. Cost per ton milled increased from 22s. 9d. to 23s. 8d., and per ounce produced costs rose from 112s. 10d. to 118s. 6d., reflecting both increased working costs and lower yield per ton which was 3.994 dwt. as compared with 4.037 in 1944.

Tons milled for the 1945 period was 44,086,700, only 5,300 tons below the corresponding period in 1944. Gold production for the period was 118,840 oz. below the 1944 yield, which was 9,284,096 oz.

★September gold production from the Transvaal totaled 1,002,716 oz., compared with August production, which was 978,097 oz. Witwatersrand district produced 982,537 oz. of the September total; other districts produced 20,179 oz.

## AUSTRALIA

### Aluminum dust legislation introduced—Uranium control bill proposed—Largest dredge to resume operations

★A bill has been introduced into the State Parliament to make the use of aluminum dust (to combat silicosis) compulsory in the change houses of the large mines of the State, but inhalation is not compulsory for the employees. However, labor unions and the employees generally believe that the method of treatment is so important that all workers will take full advantage of it. Interest in the matter is general throughout the gold-mining industry of the Commonwealth. The question has been raised as to whether the method will be equally efficacious in mines working other metals as in the case of gold, owing to the possible influence of such metallic minerals on the aluminum.

★Interesting exploratory work is about to be undertaken by a Western Australian gold mining company, the name of which has not yet been disclosed. It has long been held that the salt lakes of Western Australia represent old drainage channels which have ceased to function, consequent upon the great erosion of the land surface, and that these salt lakes may contain alluvial gold deposits in the vicinity of extensive areas of primary rocks containing gold. The company is prepared to undertake geophysical surveys and to follow with exploration. To assist the company in taking up and holding areas essential to such an undertaking, the Government is introducing legislation to permit the granting of the necessary prospecting areas. The terms of the bill will limit the exploration to deep alluvial deposits, and the holder of the reservation will not be able to exclude the right of any individual to carry on legitimate prospecting on the area, or to work alluvial ground to a depth not exceeding 30 ft.

★ Development of atomic energy, involving the use of uranium, is directing attention to the occurrences of such ore in South Australia. Legislation has been introduced into the State

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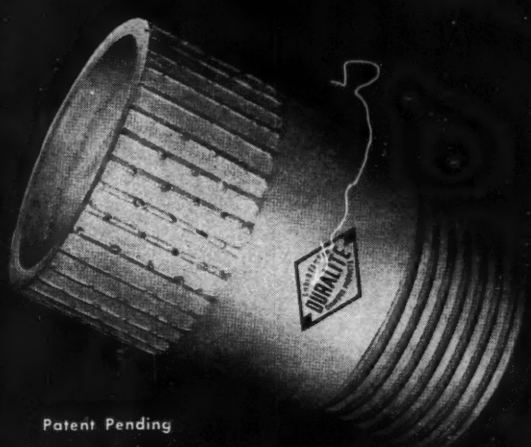


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## Australia (*continued*)

Parliament, providing for all discoveries to be reported and giving power for special leases to be granted to companies prepared to investigate the mineral resources of a wide tract of country.

A minimum bond of £1,000 must be provided to guarantee that all terms and covenants of the special leases will be observed. It is also provided that if uranium minerals are found associated with other minerals of economic value, the Government will purchase the uranium at a price probably based on the cost of production plus a reasonable profit to be determined by the minister. Between the years 1910 and 1932, uranium ores were mined intermittently at Mount Painter, in the Flinders Ranges, 80 miles east from the railway at Farina, which is 380 miles north of Adelaide. Principal ores worked were torbernite and autunite. The occurrences were small and the depths reached did not exceed 100 ft.

At the period of activity, ending in 1932, the ore was sent to New South Wales for the extraction of radium. At the same time, carnotite was mined at Olary, on the railway to Broken Hill, 257 miles from Adelaide, and the lode, which was 3 ft. wide in similar formation to that at Mount Painter, was followed to a depth of 140 ft. Operations at these two centers did not stimulate any active prospecting for these minerals, so that it is possible important finds might result from more intensive exploration in the Flinders Ranges and near Olary.

★Australia's largest dredge, which was completed just after the beginning of the war and was forced to suspend operations after a few weeks' run, will resume operations now that the Commonwealth Government has given permission to Harrietville (Tronah), Ltd., to engage key personnel. Preliminary work is in progress. The dredge weighs 4,713 tons and has a pontoon 300 ft. long, 72 ft. wide, and 12.5 ft. deep. Buckets are of 20-cu. ft. capacity. and dredge capacity is 350,000 cu. yd. per month. Digging range is 130 ft. below water level. Installed power is electric, equivalent to 1,675 hp. Resoiling will be part of the operations.

### QUEENSLAND

★Mine development work which will total 10,000 ft. is being started at Mount Isa Mines, Ltd., to make up for development arrears in the silver-lead-zinc section of the mine. A sinking hoist is being installed at No. 8 level for further sinking of the shaft from the No. 9 to the No. 11 level. Development of this part of the mine will be pushed so as greatly to increase production of lead and zinc, concurrently with maintenance output from the copper section, which at present is producing 26,000 tons of ore and recovering 1,000 tons of blister copper per month.

## Washington Reflections

(*Continued from page* 89)

dant mineral resources. We have become so accustomed to plenty that, as a nation, we have taken our resources for granted. As a result, too many of us are now disposed to shrug aside the threat of impending scarcities, preferring instead to regard justified warnings as defeatist propaganda—out of tune with our tradition of accomplishment. . . .

"On the basis of present knowledge of our mineral resources, there is reason for pessimism as to our supplies of some of the supposedly common metals. Their production during recent years has not been balanced by comparable discoveries of new reserves. Our current situation seems to indicate a trend toward imminent national shortages. This is accentuated by the fact that abnormal war demands required full attention to production and only minor attention to the proving up of new reserves—at least in the case of the metals. It should be borne in mind that under acceptable mining practice properties are never completely explored in advance of development. Excess exploration is expensive and ties up an undue amount of capital. Therefore the developed reserves at a particular date seldom properly indicate the potentialities of a mine or a district.

"As a result of the war, our proved reserves are indeed dangerously low, and unless the deficiencies are overcome by immediate and successful exploration on a grand scale, it is reasonable to predict that we will have to depend upon foreign sources of supply. . . .

"We will probably never run out of iron ore in this country; but the cost of producing iron will increase with the years, as lower grade and widely scattered small deposits become our chief reliance. Price differentials between domestic and foreign iron will no doubt tend to equalize, and imports will therefore increase. Tariffs, quotas, cartels, or international agreements are important factors in such situations, but they obviously lie outside of the scope of this paper.

"Next to iron our most important metal commodity is probably copper. Because of the tremendous wartime demand for copper much of our known reserve has been severely depleted. At the prewar production rate of approximately 800,000 tons per year, and at the prevailing price of 12c. per pound, our copper mines can be operated profitably for about 13 years on present proved reserves. No allowance is here made for inferred ore which will ultimately swell the total. This does not mean that our copper reserves will be exhausted in 13 years. It does mean, however, that the rate of copper production will fall off sharply unless exploration results in the discovery of additional ore. The alternatives to successful exploration and improvement of techniques are high-priced copper and increased dependency upon foreign supplies. The outlook for maintaining our present status of reasonable self-sufficiency in copper is good, but it is by no means a certainty.

"The situation with regard to lead and zinc in this country is similar to that of copper. Our known reserves of lead are sufficient only to maintain a normal four-year supply of recoverable metal at present prices. By inference, based upon geologic knowledge, we can assume that exploratory drilling and extension of mine workings in present producing districts will probably prove up additional reserves to guarantee an eight-year supply. We can therefore estimate that we possess a total known, indicated and inferred lead supply equal to a 12-year demand.

"For zinc, the outlook is somewhat more encouraging, at least so far as the immediate future is concerned. Our inventory shows a probable ten-year supply remaining to be mined, and the possibility of proving up as much more.

"Many strategic mineral industries that flourished during the war will probably be forced to close down when world market conditions again become stabilized. Without the support of artificial price structures our strategic minerals are likely to continue to be strategic, in spite of the fact that our reserves are now known to be considerably larger than was thought to be the case before the war. We will no doubt continue to import them in large quantities. . . .

"Except in the case of fluorspar, there seems to be no cause for concern regarding our domestic supplies [of industrial minerals] for immediate future needs; although the trend in recent years indicates that the demand for them will continue to increase rapidly, and supply problems may develop in the years ahead. . . .

"Lacking proof—as we do—that the United States can maintain in the postwar period a mineral production rate comparable to or greater than its prewar production scale, and faced with the probability of still greater requirements as a result of increased industrial development, we must assume that the volume of our mineral imports will steadily increase in the years ahead. This conclusion should be accepted as a logical consideration in the framing of a national mineral policy. It represents the only safe approach. . . .

"This is the AGE of minerals; and nearly every technological advance involves the greater use of mineral raw materials. The supremacy of this nation in translating technologic discoveries into industrial expansion, better living, improved transportation and communication, has been attained at the expense of rapid depletion of the mineral capital that has made this progress possible. We cannot maintain that supremacy unless we have uninterrupted access to mineral raw materials, wherever they may be available."